POWER

A McGRAW-HILL PUBLICATION—ESTABLISHED 1884

ELY C. HUTCHINSON, *Editor*

Volume 71 NEW YORK, FEBRUARY 25, 1930 *Number* 8

Make the Best of It

NO MATTER how fortunate and well off one may be things will not always run smoothly.

There will be set-backs and disappointments and occasional serious misfortunes.

Even in the course of the ordinary day petty annoyances will occur and there will be more of them and they will be more calamitous to the man who allows himself to be rattled by them.

Some manifestation of the innate cussedness of inanimate objects will roil one's temper, and, calling it something that it could not be, he gives it an impatient jerk or a bang, puts it entirely out of commission and makes for himself hours of work when a cool look to see what was hindering it from yielding to his first efforts would have brought success and satisfaction in a few minutes.

There is trouble in the plant. Somebody has made a mistake or neglected something. The Chief, instead of quietly sizing up conditions and enlisting the good-natured co-operation of everybody toward getting things to going, fumes and fusses, bawls the offender out, incites resentment and confusion instead of well-directed helpfulness and gets himself and everybody else out of sorts and order for the rest of the day.

"The man who's worth while is the man who can smile when everything goes dead wrong."

The man who when annoyances and misfortunes come can calmly seek their causes and stop them or estimate their extent and do all that is possible to minimize their consequences will be the winner.

Temper gets nobody anywhere except into trouble. Its manifestation makes one ridiculous and disagreeable to others, upsets his own peace of mind, and ruins his effectiveness.

Don't be a grouch but a mender. When things go awry try all the harder and the more intelligently to make them go right. A cool sensible study of causes and conditions will do more than volumes of cussing.

F. R. Low

12 Months' Progress in Equipment Design

PRACTICE in the field of power generation, transmission and application is progressing swiftly. Each advance entails new designs to meet the new conditions. The past twelve months have been especially prolific in such new equipment.

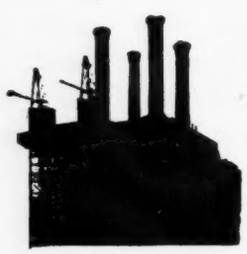
The general application of higher steam pressures has not only affected boiler practice but has also been responsible for the adaptation of many lines of boiler accessories, valves and fittings, traps, control equipment, and meters to such pressures. A constant urge toward higher rates of driving and toward greater efficiency has brought about improvement in water walls, fuel-burning equipment, prime mover refinements and the employment of materials of construction better suited to the more severe operating conditions. In the field of application and power services many new motors, starters, pumps, air compressors, heating devices and air-conditioning equipment are noted. The more general use of welding has also left its stamp on many designs.

Each week *Power* describes what is currently new in the field; but at the time the reader may not be in a position to use or have need for such equipment. Later the necessity arises, but he finds that he has not clipped the item, and a hazy recollection of having noted something of the kind is all that remains.

For the reader's convenience in this respect *Power* last year devoted a whole number to new equipment that had been described in its columns during the preceding twelve months. This proved a revelation as to what was happening in the field, and provided a useful reference. So well was the idea received and the letters of approval were so numerous as to make it apparent that the Equipment Review should be made an annual feature as a service to the readers.

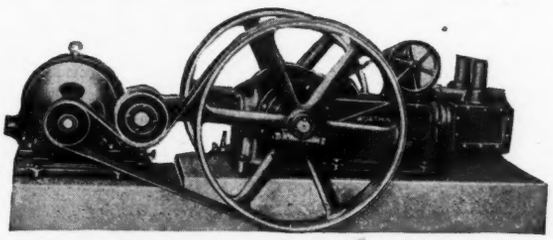
This year's review covers equipment described for the twelve months ending January 28, 1930. Nearly four hundred items are described, covering all steps from the handling and burning of the fuel to the application of the steam, electricity, and attendant services.

Power trusts that its readers will make full use of this review, and welcomes suggestions that may make it of still greater value in the future.



Air Compressors, Filters and Accessories

Units with the high- and low-pressure cylinders and intercoolers combined in one casting, machines arranged for any form of drive, adoption of roller bearings on the crankshaft journals and units with interchangeable parts represent recent additions to this line



Roller-Bearing Equipped Compressor

Elimination of bearing adjustments through adoption of roller bearings on the main crankshaft journals is a feature of this compressor. The line includes the single horizontal straight-line series, in capacities ranging from 100 to 300 cu.ft. per minute.

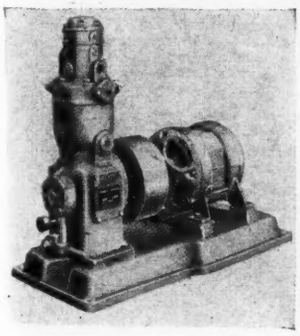
Regulation may be by an automatic starter and pressure switch mounted on the motor, or a pressure regulator may be attached to the compressor inlet valves. The compressors can be furnished with ball-bearing idlers for short belt drive; with Texrope drives, using V-type ropes; or a synchronous motor may be directly mounted on the compressor crankshaft.

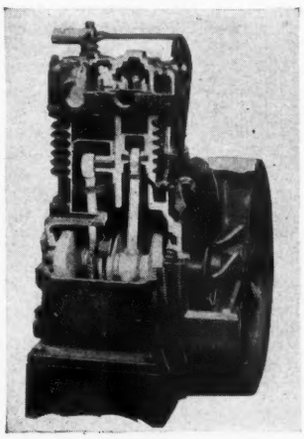
Worthington Pump & Machinery Corporation, Harrison, N. J. July 23, page 143.

Two-Stage Vertical Compressor

Low- and high-pressure cylinders and intercooler are combined in a single casting in this two-stage vertical tandem-type air compressor. The unit is designed to give 24 cu.ft. of air per minute at pressures up to 500 lb. It can be furnished with pulley for V-belt drive or for direct connection to an electric motor, steam or gas engine. It is particularly suited for oil and gas engine starting purposes and other services requiring small volumes of air at moderately high pressures.

Gardner - Denver Company, Denver, Colo. Dec. 17, page 978.





Small Compressors in Single and Duplex Types

Eleven models, stationary and portable, arranged for motor, gasoline - engine or lineshaft drive, are included in this series of small air compressors.

There are three general classes: Single-cylinder, single-stage; two-cylinder, two-stage (duplex); and two-stage. The first two are for intermittent service at pressures not exceeding 150 lb. and are either air- or water-cooled. The two-stage type is for either intermittent or continuous service under pressures from 150 to 200 lb. and is air-cooled. All are of vertical construction, and automatic or manual starting and unloading devices are provided. Two-stage units have either a single- or double-coil intercooler system consisting of a copper coil mounted on the high-pressure side. Flat belt pulleys, either tight or loose as desired, are furnished.

Curtis Pneumatic Machinery Company, St. Louis, Mo. June 4, page 942.

Self-Contained Two-Stage Compressor

Built for working pressures up to 200-lb. continuous duty, this line of air-cooled, two-stage air compressors is put out in four sizes, ¾, 1½, 3 and 5 horsepower. The units are self-contained, motor and compressor being mounted on a steel base, which is attached to the top of the air receiver. The intercooler, which consists of three curved copper tubes with extended surfaces, is located behind a fan-type flywheel, and a current of circulating air is driven directly across them.

Automatic start and stop control, furnished as standard equipment, operates independently, but in conjunction with an unloader. A centrifugal governor on the end of the crankshaft allows the air in the high-pressure cylinder and intercooler to exhaust and prevent the compressor from starting against a load.

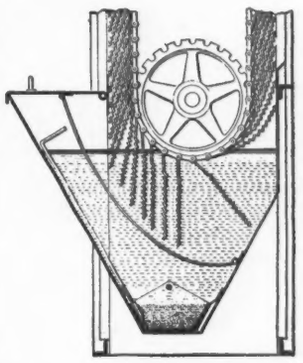
Standard L-R plate valves, bronze connecting rod with solid ends, full floating piston pin with bronze bushings, balanced crankshaft and a self-cleaning air filter are some of the important features of the unit.

Ingersoll - Rand Company, New York City. Dec. 24, page 1012.

Compressors With Interchangeable Parts

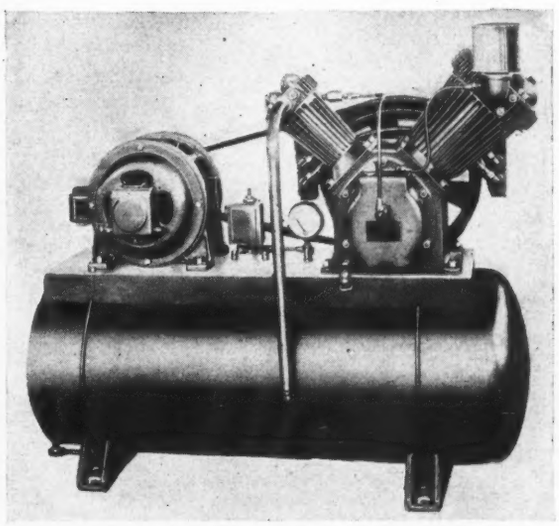
This line of air compressors offers an unusually wide selection in sizes and styles, units being available in 30, 55, 90, 100, 110, 220 and 330 cu.ft. displacements and in the portable and stationary types with various styles of mountings. An important feature is that all parts except the crankshaft unit are interchangeable on all sizes and types. All bearings are bronze-backed and babbitt-lined. The 330-cu.ft. unit has a three-cylinder compressor. A control board groups all instruments in an easily accessible position.

Buhl Company, Old Colony Building, Chicago, Ill. March 12, page 447.



Multi-Panel Air Filter

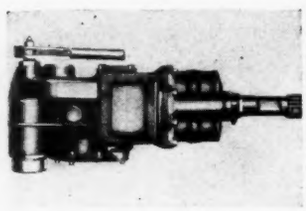
An important feature of the multi-panel air filter illustrated is the method of separating the panels and cleaning each one individually as it passes through the oil reservoir at the bottom of the stand. The filtering medium consists of a multiplicity of overlapping screen panels that form a continuous movable curtain. To increase the capillary surface effect these panels are coated with liquid bakelite, covered with fine fiber and baked in an oven. This forms a porous fibrous coating



capable of retaining a large amount of adhesive.

The panels, which are suspended from horizontal rods carried by two endless chains, overlap each other, forming a filtering curtain with a depth of five panels at every point. The curtain, which may be operated by a solenoid and ratchet mechanism or by a hydraulic drive, moves ¾ in. every 12 min., or 3¾ in. an hour. Under severe dust conditions the speed may be increased to maintain a normal operating resistance. As the panels reach the lower turn they automatically separate and are cleaned, one at a time, by swinging in the oil through an arc of 90 deg. These are made in sizes from 5 to 13 ft. high and in capacities based on an average air velocity of 500 ft. per minute, ranging from 3,000 to 84,000 cubic feet per minute.

Reed Air Filter Company, Louisville, Ky. Aug. 20, page 300.



Close-Quarter Air Drill

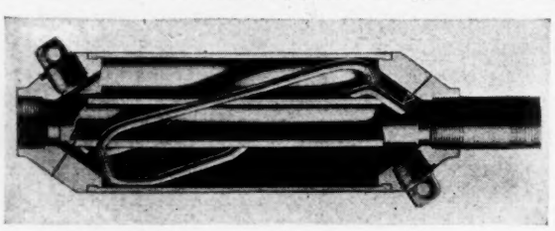
The air-driven drill illustrated is designed especially for use in close quarters and to give 20 per cent more horsepower and 10 per cent higher stalling power than the former units of its type.

Smoother operation has been secured by arranging the pistons to act at right angles to and in a plane with the spindle. A counterbalanced crank, herring-bone gear for the final drive and anti-friction bearings are used. Three different spindles can be furnished.

Ingersoll-Rand Company, New York City. March 26, page 519.

Air-Line Lubricator for Pneumatic Tools

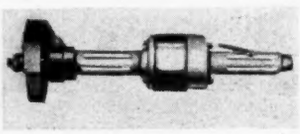
The air-line lubricator illustrated provides a simple and practical means for lubricating



the lighter weight pneumatic tools. It consists, essentially, of a cylindrical reservoir with a centrally located tube, around which there is a still smaller tube with a strainer screen in each of its two loops. The two ends of the small tube enter the center tube at opposite ends and on opposite sides, and the operation of the lubricators is effected through the differential pressure between these two points.

Oil enters the small tube through screened openings, and by using two of these openings, one at each end on either side of the main air tube, a steady supply of oil is assured, regardless of the position in which the lubricator is placed. It is available in pint and quart sizes, 8 and 12 in. long, respectively.

Ingersoll-Rand Company, New York City. Dec. 10, page 941.

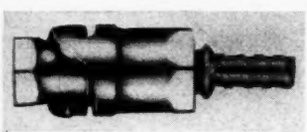


Multi-Vane Grinding Unit

This portable air-driven grinder is adaptable to a wide variety of services in addition to grinding, buffing, etc. When fitted with wire brushes it can be used for cleaning scale and rust from flat surfaces, ammonia condenser tubes and similar equipment.

A governor prevents a grinding wheel or other tool being operated at dangerous speeds and provides a means of adjustment to any desired value up to 6,300 r.p.m. Standard machines are set at 4,200 r.p.m.

Ingersoll-Rand Company, New York City. Apr. 2, page 559.



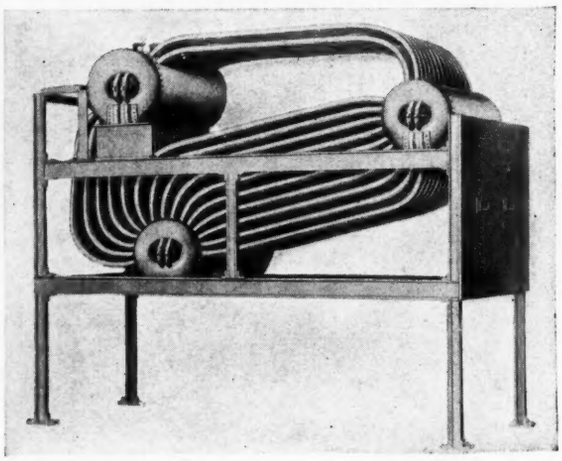
Small Air Hose Coupling

A quarter turn connects or disconnects this air hose coupling, which has no springs or loose parts. A special leather gasket, not affected by oil or other air line substances, is used. The gasket is expanded by a V-shaped sliding ring when pressure is applied. The coupling, with the hose shank, is 3½ in. in over-all length.

Robinson Machine Company, Muskegon, Mich. Feb. 19, page 321.

Boilers, Furnace Walls and Air Heaters

The introduction of small water-tube boilers for installation where the head room and floor space is limited, and the elimination of the wrapper sheet in box-header construction through the adoption of single seams are among the important improvements in steam generating equipment.



Low-Head Water-Tube Boiler

For locations having limited head room and floor space this low-head boiler is especially adapted. Sizes range from 750 sq.ft. of heating surface up to about 3,500 sq.ft., which makes it suitable for small industrial plants and heating purposes. Feed water is introduced into the rear upper drum, where it enters a feed pan and is distributed the entire length of the drum. The boiler is supported directly on the steel frame by brackets riveted on the ends of the upper drums. The lower rear drum is supported directly by the tubes.

The boiler is adaptable to a furnace designed for any standard type stoker or hand firing, as well as to oil and gas burning. The smaller units can be shipped completely assembled, and any part of the larger boilers will pass through a four-foot doorway when shipped "knocked-down."

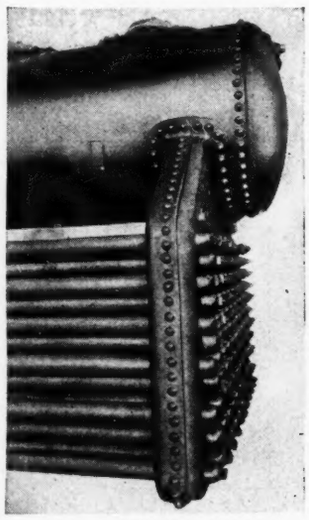
D. Connelly Boiler Company, Cleveland, Ohio. Sept. 3, page 387.

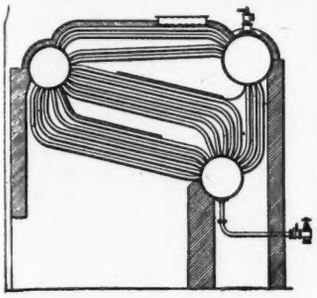
Single-Seam Box-Header Boiler

Among the advantages claimed for the single-seam box-header boiler construction now used on box-header units of the Heine and Walsh-Weidner types are high factor of safety, elimination of wrapper sheets, only one row of rivets, and the placing of the single riveted joint out of the fire zone.

This construction gives one calking edge only, which faces the outside, making it readily accessible for inspection.

Combustion Engineering Corporation, 200 Madison Ave., New York, N. Y. Jan. 28, 1930, page 153.





Water-Tube Boiler for Limited Space

Designed especially for limited space conditions, particularly where the head room is low, the type VM boiler illustrated is made in a number of sizes and pressure ranges, from 1,595 sq.ft. to 4,464 sq.ft. of heating surface, and 5 to 250 lb. working pressures, respectively.

Various setting arrangements permit the method of firing best suited to application conditions and load requirements. Provision is also made in the design for the installation of a superheater.

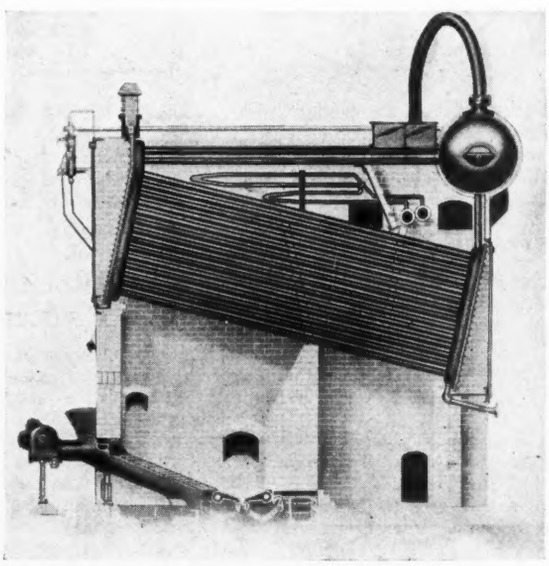
In the pressure range from 160 to 250 lb., boilers with two sizes of drums, 36 and 42 in. I.D., are available. The tube diameter is 3¼ in. O.D., No. 11 gage tubes being used in the 160- and 180-lb. range and No. 10 gage in pressures above this.

Combustion Engineering Corporation, 200 Madison Ave., New York, N. Y. Jan. 21, 1930, page 116.

Boiler With Single-Seam Headers

In this cross-drum boiler the headers are of the box type with a single seam. The tube sheet is press-formed to provide water space in the header, while the handhole sheet is flat, the two being riveted together around the outer edge. With this construction the wrapper sheet is eliminated and it is possible to drive all the rivets hydraulically, which insures a better joint. An additional advantage is that all rivets are out of the fire or hot gas zone. The rear header is straight, while the front one is bent slightly to permit the two upper horizontal circulating tubes from the drum to enter at right angles to the sheet. The boiler is designed to provide a wide range of sizes to meet low-head room conditions and to utilize any standard firing method.

Erie City Iron Works, Erie, Pa. Dec. 31, page 1049.



Water Wall With Forced Circulation

A type of furnace wall in which small tubes and forced circulation are used is illustrated. Positive circulation in the tubes is maintained in a single direction by a centrifugal pump and the distributing orifices meter the proper quantity of water to each tube. Water enters the circulating pump by gravity from a drum of the boiler, and its pressure is increased by the pump 15 to 40 lb., depending upon the rate of heat absorption of the water wall.

The capacity of the orifices n the distributing header is such hat the quantity of water forced into each tube is several times the quantity that will be evaporated under the condition of naximum heat absorption. With this construction the tubes may be installed vertically, horizontally or at any desired angle, with flow either up or down, and the tubes can be bent at any angle to avoid structural obstacles and furnace openings. Its adaptability permits installation where it would be impossible to make use of the natural-circulation type of water wall.

Riley Stoker Corporation, Worcester, Mass. April 30, page 717.

Air-Set Cement and Baffle Mix

This No. 80 air-set cement is suitable for bonding firebricks in thin walls, door linings and for similar applications, as it will set hard without the employment of heat and will bond at all temperatures. It can be used up to within 50 deg. of its melting point, 2,875 deg. The baffle mix is suitable for making poured or molded boiler baffles and for lining explosion doors or cleaning doors not subject to the temperatures encountered in the furnace proper. It retains its hardness up to temperature of 2,700 degrees.

Babcock & Wilcox Company, 85 Liberty St., New York City. Aug. 6, page 223.

Superheaters for H.R.T. Boilers

An improved line of superheaters available in two types and designed especially for installation in a horizontal position at the rear of a return-tubular boiler is illustrated.

In one the tubes are almost straight, being rolled into opposite headers and criss-crossed with slight offset to provide for expansion and contraction. In the other type, tubes are arranged so that the steam makes three passes; coming in at one header and out at the opposite one.

Both units are provided with cast-iron cover plates supported from above and resting upon the headers. There are also removable screwed plugs at each end of every tube, and drain and safety valve connections are provided.

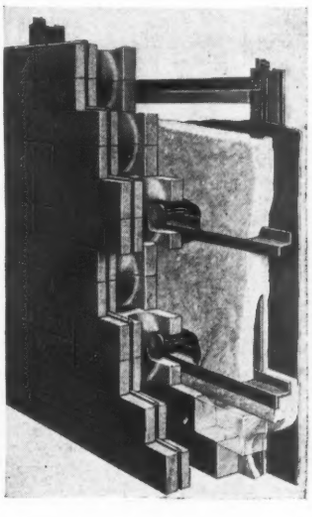
The superheater replaces the regular rear arch, but is elevated above the top row of tubes and placed free of the tube sheet, the space between the inner tube and the sheet being closed with the cover plates and insulation.

The Marley Company, Kansas City, Mo. Dec. 31, page 1051.

Air-Cooled Furnace Wall

With three times as much heat-dissipating as heat-absorbing surface, this air-cooled wall makes it possible to maintain uniform face temperatures approximately 600 deg. below that of the furnace.

Two types of wall are available, one designed for relining work, principally in stoker installations, and the other a complete wall for any type of boiler furnace. The complete installa-



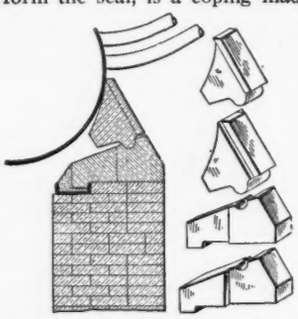
tion is a sectionally supported wall, 18 or 22½ in. thick, consisting in one case of 13½ in. of air-cooled blocks supported on steel framing, backed by 4½ in. of rock wool insulation and a steel casing. In the other the same block construction is backed by common brick.

Floating rows of blocks are supported by anchored blocks, leaving each section of two blocks free to expand as a unit, or to be removed without disturbing adjacent sections. For each square foot of furnace wall there is approximately 36 sq.in. of free air lane surrounded by hot refractory, making possible heat dissipation at a rate of 4,500 to 6,000 B.t.u. per hour.

The Furnace Economy Company, 407 South Dearborn St., Chicago, Ill. Mar. 26, page 521.

Bridge-Wall Seal

The construction of this bridge-wall seal offers more flexibility than the standard form of bridge wall. The wall is built up, as usual, to a height somewhat below the bottom of the drum, and on top of it, to form the seal, is a coping made



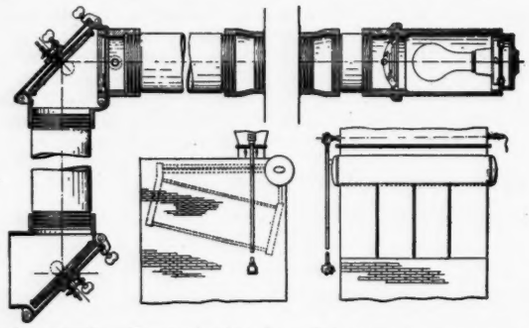
up of the two shapes, as shown. The larger blocks, resting on top of the bridge wall, have shoulders that pass over the leg of a channel to hold them in place. A depression in the upper face of the lower block forms a bearing into which fits a semi-circular half-section projecting from the upper block that leans against the drum. Rotation around the axis thus formed permits the upper block to follow the movement of the drum.

Michael Liptak, 1603 University Ave., St. Paul, Minn. July 2, page 25.

Smoke Indicator

A simple device that permits the operator to observe the quality of the smoke leaving each boiler before it enters the main breeching or the stack is illustrated.

It consists of a specially constructed lamp unit which projects a ray of light across the gas passage to a second, or



"reflecting," unit. From the latter the light ray is reflected to an extension vision box (which is located at the front or side of the boiler, depending upon the type), so that the operator can readily observe the smoke image by means of the indicator from the operating floor. The indicator is adaptable to practically any type of steam boiler and may be used for oil, or with coal in hand-, stoker- or pulverized coal-fired furnaces.

The Wager Furnace Bridge Wall Company, Inc., Jersey City, N. J. Oct. 15, page 612.

Smoke Eliminator

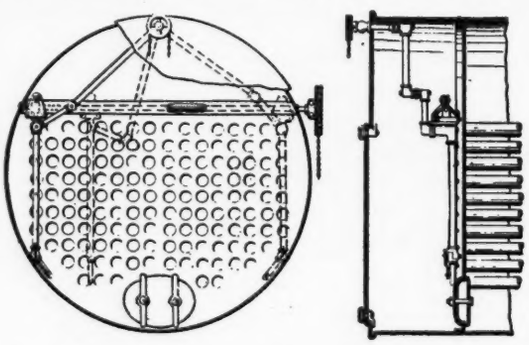
A device designed to admit preheated air at two or more points as well as to increase the turbulence of the gases over the fire bed is illustrated. It consists of cast-iron venturi-shaped ducts in the bridge and side wall to carry air from below the grate to a point above the fire. Air enters above the fire bed through constricted openings in the form of a blast, the amount admitted at these points being controlled by louvered openings below the grate the position of the louvers, in turn, being controlled from the front of the boiler.

Two or more steam-air jets fitted with fan-shaped nozzles in the front wall of the furnace provide sufficient turbulence to insure thorough mixing of the gases and the air admitted through the walls. This device is equally adaptable to hand- and stoker-fired furnaces and to practically any type of boiler.

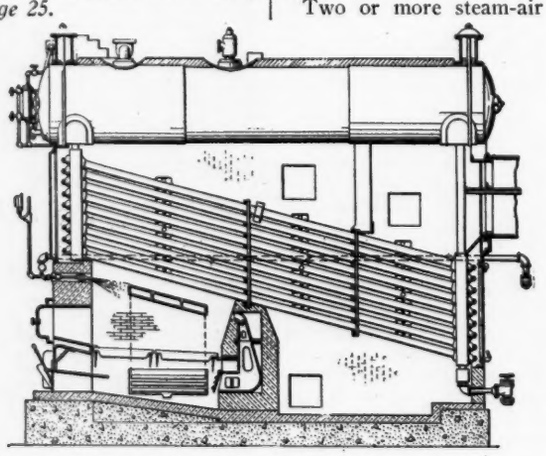
Luks Smoke Carburetor, Inc., 40 White St., New York City. Oct. 8, page 573.

Tube Cleaner for H.R.T. Boilers

Effective cleaning by a straight blast through the tubes with high velocity and the entrainment of a maximum amount of air or gas are among the claims made for this soot blower. It is designed especially for use with horizontal-return-tubular boilers and to have a straight-line movement across the tubes. The movement of the nozzle group across the head is effected by a screw and a nut in the body of the trolley, the screw being turned by a chain and wheel at the side of the boiler. The steam valve is also operated from the floor by a chain. When not in use the cleaner is run to one side of the boiler.

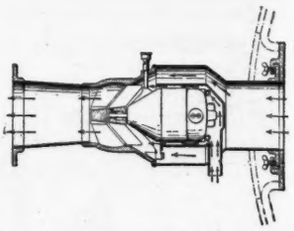


Wheelock-Bogue, Inc., Boston, Mass. Sept. 3, page 385.



Boiler Manhole Exhauster

This manhole exhauster is similar to the manhole blower made by this company except that it is designed to exhaust the air from the boiler drum or other vessel instead of blowing the air into them. The motor is protected from dust in the air stream and is arranged for independent cooling by means of a separate housing. The



flange on the diffuser and the one on the inlet thimble have the same dimensions, so that the unit can be reversed and used as a blower instead of an exhauster, as occasion demands. The exhauster is equipped with a ½-hp. universal motor and is built for manhole sizes of 11 x 15 and 12 x 16 inches.

Coppus Engineering Corporation, Worcester, Mass. Dec. 24, page 1014.

High-Temperature Cement

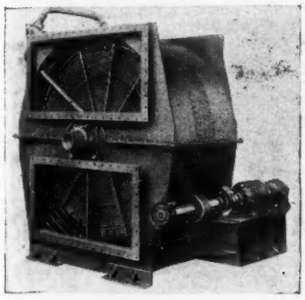
Among the destructive furnace actions to which this new cement (Adachrome Plastic Super-Cement) is said to be resistant are basic and acid slags, molten metal penetration, abrasion, erosion, and chemical reaction in the burning of acid sludge. In addition, the material when applied as a surface coating on boiler settings protects the brickwork from the penetrating action of clinker and fusible coal ash. It is suited for making either dipped or troweled joints. Two sizes of drums, 250 lb. and 500 lb., are available.

Botfield Refractories Company, Philadelphia, Pa. Jan. 28, 1930, page 154.

Horizontal Rotative-Type Air Preheater

This Ljungstrom regenerative, horizontal-type air preheater unit is designed for use with independent fans and is particularly adaptable to high-temperature industrial work. It is built in three constructions, for flue-gas temperatures of 1,000, 1,200 and 1,600 degrees.

The rotor, on which is mounted the usual Ljungstrom heater elements, is carried on two double-row roller bearings. The shaft is hollow, and water circulation is provided to keep



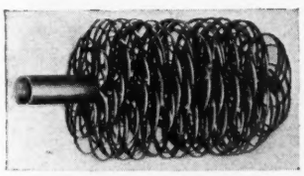
the bearings at a proper temperature. Sealing is effected in the same way as on the vertical type units, as is also the cleaning.

Several sizes of the heater are available. They number from 1 to 22, inclusive, and range in square feet of heating surface from 765 to 58,700.

Air Preheater Corporation, New York City. Jan. 28, 1930, page 154.

Tube- and Flue-Cleaning Brush

This tube-cleaning brush is composed of a number of eccentrically wound spirals of tempered high-carbon steel wire having square corners. When the brush is pushed into the tube or flue the forward pressure causes the outer edges of

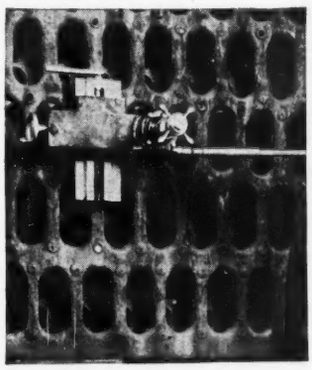


the flat wires to tilt until their square edges press against the inner surface with a powerful scraping action. This action is independent whether the brush is rotated or pushed straight forward by hand, or rotated by a flexible shaft.

Specialty Manufacturing Company, Cleveland, Ohio. Oct. 1, page 532.

Machine for Back-Facing Handholes

In this portable machine for back-facing the insides of handholes in water-tube boilers a spindle for holding a cutter is incorporated in a cross-slide mounted on a base that can be clamped to the face of the boiler. An electric motor or an air drill can be used for power. A

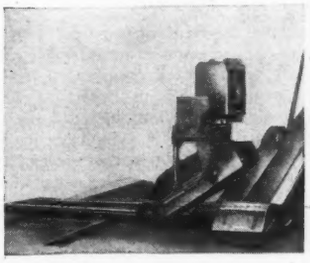


ratchet feed provides for longitudinal travel of the cross-slide, the transverse travel being universal. This combination of movements makes it possible to bring the spindle in position above the handhole after the machine has been clamped to the boiler. By loosening four nuts the worm housing can be adjusted to four different positions to accommodate the drive shaft from four different angles.

Davenport Manufacturing Company, Meadville, Pa. Feb. 5, page 245.

frame, including the top sliding plate, is 4 1/16 in. Either an electric motor or a gasoline engine can be used as the drive.

Barber-Greene Company, Aurora, Ill. March 19, page 481.



Coal Car Unloader

Designed especially for unloading hopper-bottom cars of coal and coke, the light car unloader illustrated has a capacity of 1 ton a minute, and is only 3 3/8 in. thick over the rails, allowing ample clearances for the largest hopper doors. Also, the delivery end of the feeder is elevated so that it can discharge directly into a flight conveyor placed at the same level.

The machine is powered with a gas engine or electric motor and is so balanced that one man can raise one end easily for moving.

Barber-Greene Company, Aurora, Ill. April 2, page 559.

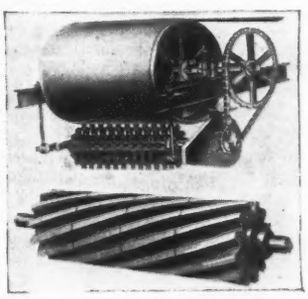
Automatic Scale for Materials in Transit

For the continuous weighing of coal or other material in transit on conveyors the scale illustrated is especially adapted. Two carrying idlers of the belt are mounted on a floating platform over which the belt travels with the load. The weighing mechanism consists of a scale beam balanced by calibrated springs. Beneath the end of the beam is the integrating mechanism, consisting of two drums, which are caused to revolve toward each other at a speed proportional to that of the belt by a traction roller and transmission. The design of this mechanism is such that it opens and closes an electric circuit. Impulses occasioned thereby operate an electro-mechanical device which is geared to a continuous register at a ratio to convert the impulses into pounds, tons, barrels, or other units. The register and recorder may be installed at any distance from the machine or from each other. A load-indicating device is also incorporated.

John Chatillon & Sons, 89 Cliff St., New York City. Sept. 3, page 386.

Rubber Cleaning Brush for Belt Conveyors

Designed to give better cleaning results with less wear on the belt than the former types, the squeegee brush illustrated consists of a series of spiral flutes made of high-grade rubber. The roll is 7½ in. outside diameter and made up in sections 6 in. long. The sections are mounted

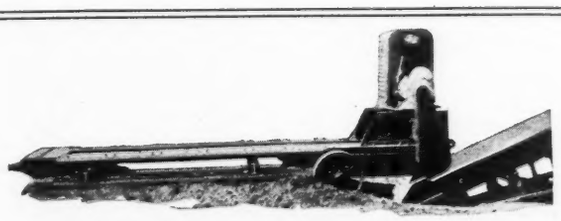


on a wooden core the same diameter as on the older type brushes, so that the brushes now in use can readily be replaced by the new brush without any change in the driving mechanism.

The rubber cleaner turns with a peripheral speed of about 1,000 ft. per minute, and the wearing part is ¾ in. deep. The spiral shape of the flutes tends to keep the belt from flopping.

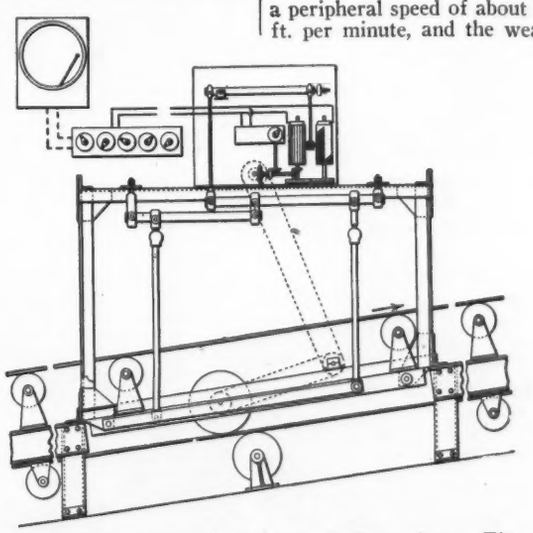
Robins Conveying Belt Company, 15 Park Row, New York City. July 23, page 141.

Coal- and Ash-Handling Equipment



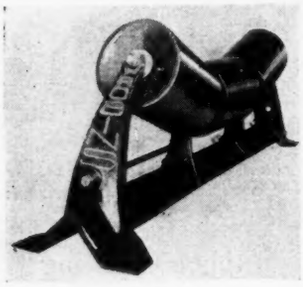
Unloader for Hopper-Bottom Cars

Coke, coal, cinders and any other free-flowing material usually transported in hopper-bottom cars are readily handled with this belt feeder. A small pit on one side of the railroad track to permit the conveyor hopper to sit under the discharge end of the feeder is all that is needed. The feeder keeps the flow of material within the capacity of the conveyor and the belt from overloading and damage. It may be used either over the rail or under the rail, as required. The maximum thickness through the feeder



Demountable Troughing Idler

In the troughing idler illustrated the three pulleys with their bearings and grease seals are interchangeable. Each is of



cast iron, with totally inclosed ends, and the unit is so designed that each pulley with its shaft can be lifted out readily from the frame. The side pulleys are set at an angle of 20 deg. from the horizontal, and the gap between the pulleys is about ¼-in., making it practically impossible for the belt to be creased at this point.

Lubrication of the bearings in each pulley is by grease forced through a high-pressure fitting to a reservoir in the hub of the pulley. All fittings are located at the ends of the idler, where they can be served without reaching under the belt. Standard sizes range from 18 to 60 in. in width.

Robins Conveying Belt Company, 15 Park Row, New York City. July 16, page 103.

Portable Pneumatic Ash-Handling System

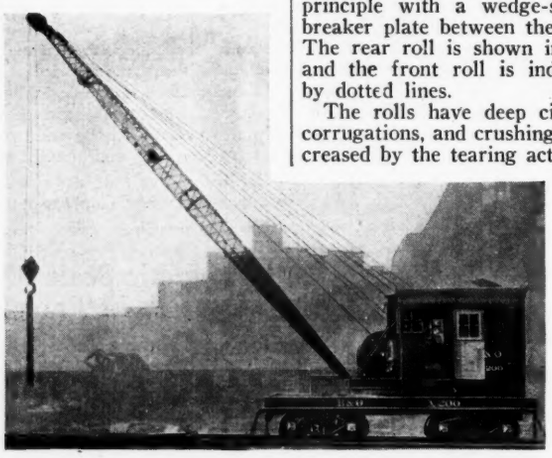
The electric-pneumatic suction ash-handling system illustrated is especially designed for removing the ashes from the basements of office buildings, hotels, small industrial plants and similar buildings. It comprises a truck containing a large hopper into which the ashes are drawn by suction and from which they are conveyed by a totally inclosed belt conveyor to a carrier truck.

The ash-handling truck is equipped with a gas-electric drive and power for operating the suction system and conveyor-belt is obtained by connecting the electric generator to the motor and running the engine of the truck. Suction is provided by a 6,000-cu.ft.-per-minute centrifugal compressor, giving the unit a capacity per minute equivalent to the contents of a dozen standard ash cans. The truck connects to the pipe line from the ash pit at the sidewalk opening by a pipe section which is lowered into place and tightly connected with the permanent pipe line.

Pneumatic Conveyors Corporation, 522 Fifth Ave., New York City. Oct. 22, page 652.

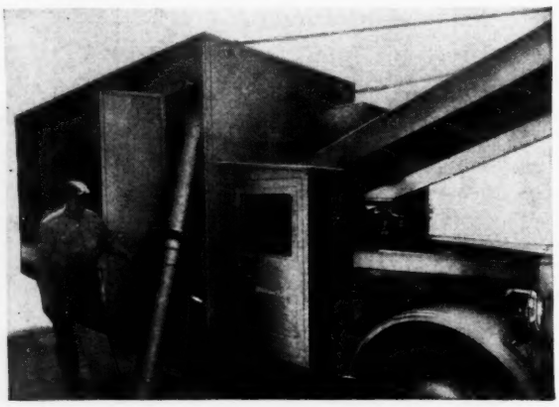
Diesel-Operated Industrial Crane

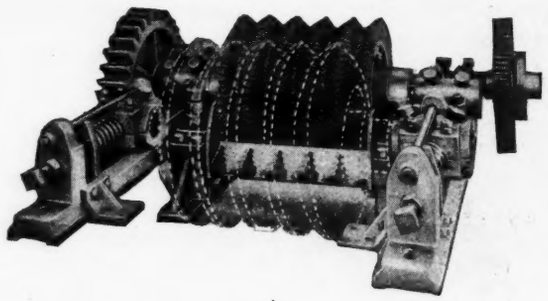
The 25-ton capacity locomotive crane illustrated is powered by a six-cylinder two-cycle



Diesel engine of the solid-injection type and is designed to burn any ordinary grade of fuel oil. The entire operating mechanism is mounted on a one-piece cast-steel rotating bed, and the side frames are also made of steel castings. The power take-off from the engine is fully inclosed, runs in oil and is equipped with anti-friction roller bearings.

Industrial Brownhoist Corporation, Cleveland, Ohio. Dec. 24, page 1014.



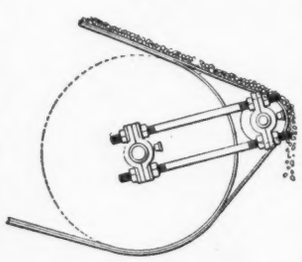


Coal Crusher With Breaker Plate

One of the important claims made for this crusher is a capacity two or three times that of single- and double-roll crushers for the same size roll and peripheral speed. This increase in capacity is effected by providing two outlets instead of one and having the orifice zigzagged in such a way as to add about 40 per cent to its length. It utilizes the two-roll crusher principle with a wedge-shaped breaker plate between the rolls. The rear roll is shown in full, and the front roll is indicated by dotted lines.

The rolls have deep circular corrugations, and crushing is increased by the tearing action of the roll faces in passing the pyramid or wedge-shaped blocks.

R. H. Beaumont Company, Philadelphia, Pa. May 14, page 797.



Duplex Conveyor System

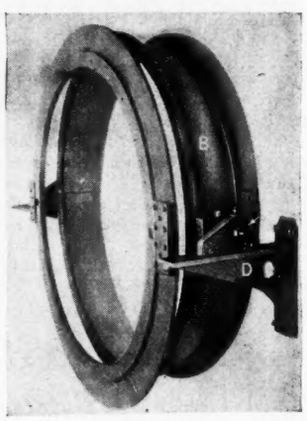
The duplex conveyor system illustrated consists in the superposition, of a wear sheet upon the conveyor belt, the latter serving merely to transmit power, while the wear sheet carries the load and takes the abrasion. The wear sheet is made in various thicknesses up to one inch, depending upon the service.

In some kinds of conveying it is desirable to reduce breakage, and the wear sheet permits this, as it is possible to run the sheet over an idler pulley at the tail much smaller than the standard tail pulley, thus making possible a short drop of the discharged material. Wear sheets are obtainable for operating on materials at temperatures up to 500 deg. F.

Boston Woven Hose & Rubber Company, Cambridge, Mass. March 12, page 446.

Seal Ring for Rotary Driers

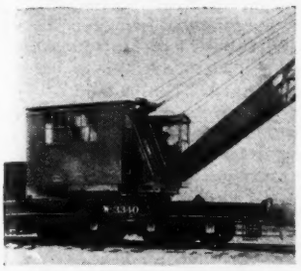
Designed especially to reduce the heat and dust loss from rotary kilns or driers by more effectively sealing the ends of the machine, the seal ring illustrated is adaptable to the rotary



type of driers used in pulverized-fuel-burning plants, as well as to those used with waste-head boilers in the various industries.

A wall plate is bolted to the furnace wall, and the seal ring is mounted on the outside of this plate and supported in ball-bearing pivots, which, in turn, are carried in trolleys. The trolleys are made to roll back and forth on brackets. A shell joint ring is bolted to the drier, and sealing is effected by the seal ring sliding on the wall plate and pressing against the joint ring. The three rings are made in halves so that they can be attached after the drier is installed.

Huron Industries, Inc., 1440 Builders Building, Chicago, Ill. Oct. 8, page 571.



Gasoline-Powered Locomotive Cranes

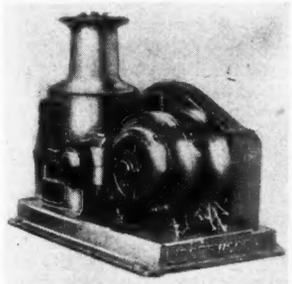
All clutches, brakes, shafts, gears, etc., are oversized in this line of locomotive cranes, which has been designed especially for gasoline engine, Diesel engine or electric motor drive. The drive from engine or motor is a totally inclosed silent chain. All upper frame gears have machine-cut teeth. Each unit is furnished with a two-speed travel gear to give a high speed for traveling light and a slower travel speed for pulling heavy loads. The crane is manufactured in five sizes.

Link-Belt Company, Chicago, Ill. Feb. 19, page 321.

Motor and Engine-Driven Capstan

This vertical capstan is particularly adapted to spotting coal cars and other uses around power and industrial plants. It is made in motor and gasoline-engine-driven types, and the space requirements are 25x34 in. It is available in five sizes: 5- and 7½-hp., alternating current, 5- and 7½-hp. direct-current, and a 6- to 8-hp. twin-cylinder air-cooled motor using either gasoline or kerosene. Both types are of weathertight construction.

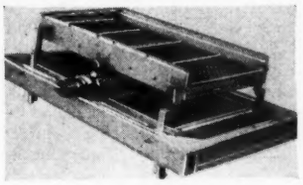
Lidgerwood Manufacturing Company, Elizabeth, N. J., June 11, page 978.



Balanced Vibrating Screen

Two screen decks are caused to vibrate simultaneously and in opposite directions in this vibrating screen by opposed eccentrics running in ball bearings and mounted on a heavy shaft between the two screens. Both ends of each deck are supported by compression springs.

The opposed motion of the two screening surfaces is said to result in greatly decreased vibration transmitted to the

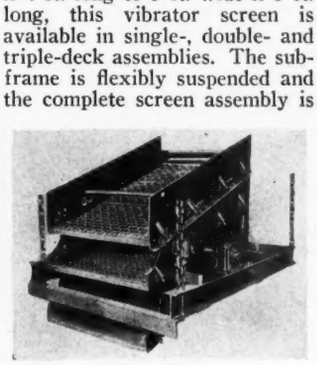


frame and driving mechanism, at the same time a vigorous and uniform vibration of both screen surfaces is maintained. Screen cloth is furnished in standard renewable trays, which are readily replaceable.

Smith Engineering Works, Milwaukee, Wis. March 19, page 481.

Vibrator Screen With Multiple Decks

Built in different widths and lengths ranging from 2 ft. wide x 4 ft. long to 5 ft. wide x 8 ft. long, this vibrator screen is available in single-, double- and triple-deck assemblies. The subframe is flexibly suspended and the complete screen assembly is



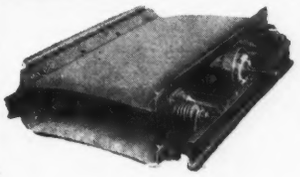
mounted on it. The driving shaft is mounted on heavy-duty anti-friction bearings, and the driving motor is totally inclosed and has forced-air ventilation.

To make the screen adaptable to a wide range of duty, four different rotor mechanisms are built for installation in the several assemblies.

Stephens-Adamson Manufacturing Company, Aurora, Ill. Jan. 7, 1930, page 38.

Improved Vibrating Screen

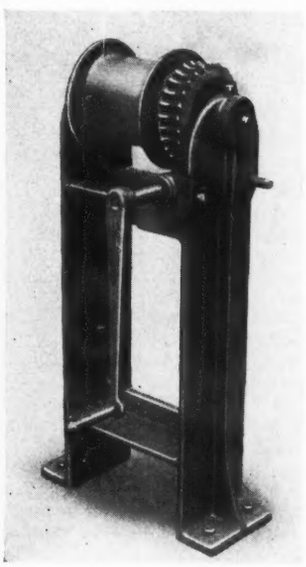
In this improved double-deck screen the driving gear or vibrating element is located between the two screens midway of the screen's length and is designed to give a uniform action over the entire surface.



The screen cloth is spring cushioned over arched supports and the angle frames to which the cloth is secured are removable from the frame as a unit. The vibrating mechanism consists of unbalanced flywheels revolving at high speed, producing a vertical circular motion.

The screens are supported from a base frame at each of he four corners by springs. The driving shaft is carried on heavy-duty roller bearings fitted with combination felt and labyrinth seals. At the normal operating speed of 1,800 r.p.m., with a stroke of about ⅛ in., approximately 2 hp. is required.

Robins Conveying Belt Company, 15 Park Row, New York City. April 9, page 600.



Hand-Operated Winch

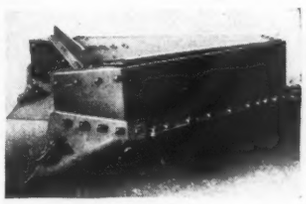
This floor-type, hand-operated winch is mounted on a cast-iron stand and is equipped with a cast-iron gear that is self-locking, thus insuring safety of the load at all times. It is capable of a rope pull of 750 lb. The cast-iron drum, which is 6 in. in diameter, has a capacity of 100 ft. of ¼-in. cable and 60 ft. of ⅜-in. cable. The winch is 34 in. high and 18 in. wide.

Stephens-Adamson Manufacturing Company, Aurora, Ill. May 7, page 758.

Plow Scraper for Handling Coal

This power plow scraper has a vertically adjustable cover plate that stops overdigging and can be adjusted to increase or decrease the normal capacity. It is made in sizes ranging from ½ to 6 cu.yd., and can be furnished in larger capacities. The cover causes the scraper to dig until it is fully loaded, when it rises to the surface and slides over the material being handled. When digging the plowshare nose and cutting edge are below the surface, the cutting edge being set at an angle of 26 deg. to the line of pull.

Adjustable up and down from the top of the side walls, the cover plate gives a 50 per cent variation in the load. The scraper can be dumped at any point by moving it backward. Different designs of plow points



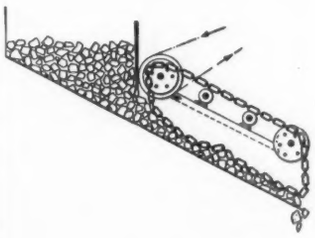
are available to meet varying conditions.

For capacities above 1½ cu.yds. the scrapers are of heavier construction than illustrated, with a double cutting edge, a double I-beam supporting the top of the front end, and digging noses of alloy steel.

Garst Manufacturing Company, 549 West Randolph St., Chicago. Aug. 6, page 223.

Chain Feeder

This feeder makes it possible to use a large chute opening and at the same time to control the flow of feed within close limits. It consists of a curtain of heavy endless steel chains driven by an overhead tumbler and suspended in front of the chute opening so as to lie on the material and to travel with it. The accuracy of control is said to be within 2 per cent on a tonnage basis. Several other variations

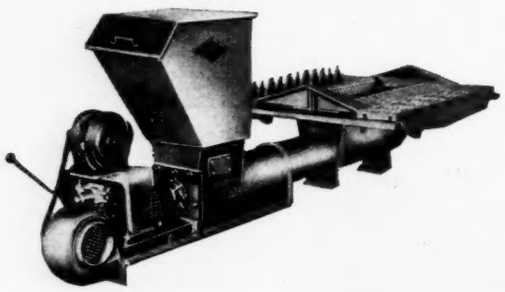


of the principle have been worked out whereby the feeder may be used in connection with chutes of variable angle or the chutes can be equipped with grizzly bars for screening out the fines.

Ross Screen & Feeder Company, 247 Park Ave., New York City. Aug. 20, page 299.

Fuel-Burning Equipment

That the stoker manufacturer is doing his part toward improving combustion conditions and lessening the smoke nuisance is evidenced by the number of new stokers which have recently entered the field and are described in these pages. Units are now available for boilers from 100 sq.ft. of heating surface up to any capacity. Improvements have also been made in coal pulverizers and burners.



Single-Retort Underfeed Stoker

Built in sizes suitable for boilers up to 2,000 sq.ft. of heating surface, this single-retort underfeed stoker is designed especially to burn screenings, slack, lignite and buckwheat.

Coal is fed from the hopper to the retort by a screw the thrust of which is taken by a roller bearing. The tuyeres are made in narrow sections and the side-dump grates are designed to give a crushing action to the clinkers as they are dumped to the ash pit. Combustion air is supplied by a multi-blade fan placed directly in front of the gear box or transmission. The complete unit is driven by a ball-bearing motor mounted on the top of the transmission and connected to both the fan and transmission through V-belts. Each stoker is furnished with an automatic pressure or temperature control.

Marion Machine Foundry & Supply Company, Marion, Ind. Dec. 10, page 941.

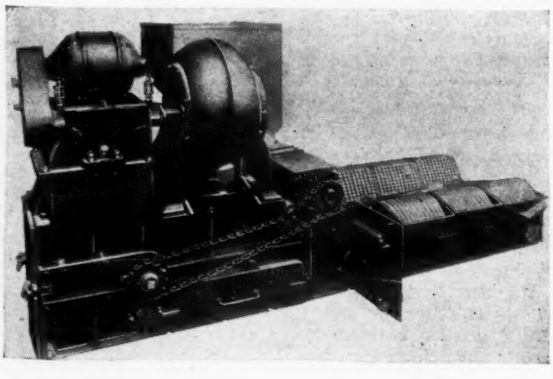
Underfeed Stoker for Small Boilers

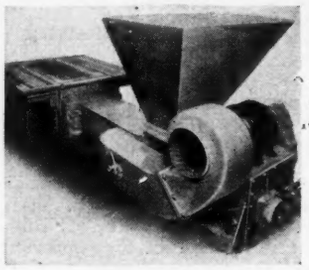
Designated the "King Coal" and designed for use with boilers in sizes up to and including 1,000 sq.ft. of heating surface, this stoker is self-contained and complete with motor drive, forced-draft fan, fuel hopper and feeding mechanism. The unit is driven by a 2-hp., 1,750-r.p.m. motor mounted on top of the gear- and air-chamber housing. Initial drive to the fan and stoker is through a silent chain. Speed reduction from the fan shaft is made by a single worm gear. Fan and stoker are mounted integrally.

A central feeding grate reciprocates, as does the feeding ram, but the stroke can be varied independently of the ram. The aerated, or active, grate surface is augmented by side plates which protect the sides of the firebox and give additional coal-burning surface.

The stoker is equipped with a pressurestat to control the coal and air supply in relation to the steam demands on the boiler.

Harrington Stoker Division of the Whiting Corporation, Harvey, Ill. April 16, page 639.





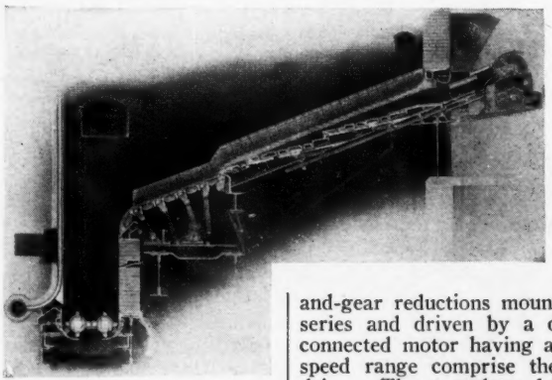
Motor-Operated Self-Contained Stoker

Adaptable to practically any standard make of heating or power boiler in sizes from 100 to 1,000 sq.ft. of heating surface, this junior-size underfeed stoker with direct-connected forced-draft fan is readily installed under existing boilers without disturbing the front or the firing doors. Electrically operated and self-contained, the unit consists, in the main, of a large coal hopper, conveyor screw, motor drive, variable-speed gear, forced-draft fan, air-admitting tuyeres and dead plates.

Combustion Engineering Corporation, 200 Madison Ave., New York City. Jan. 21, 1930. page 114.

Stoker With Undulating Overfeed Section

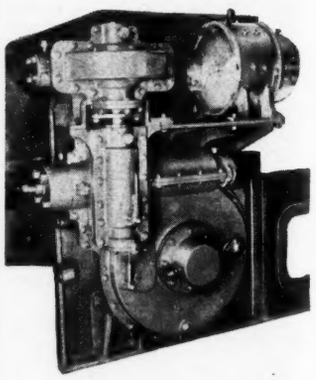
Employment of a flat undulating link-grate surface forming a large overfeed section immediately adjacent to the



underfeed retorts is a distinguishing feature of the multiple-retort stoker shown here.

This overfeed section of the grate receives fuel and refuse discharged from the retorts and [illegible]cient surface to burn a [illegible]antity of coal. Motion of the overfeed section is con[illegible]ieu separately from that of [illegible]etort rams. This permits [illegible]egulation of the ash discharge to the clinker grinder pit without interfering with the distribution of fuel in the retorts and over the tuyeres.

Westinghouse Electric & Manufacturing Company, Philadelphia, Pa. Sept. 3, page 387.



Improvements in Forced-Draft Chain-Grate Stoker

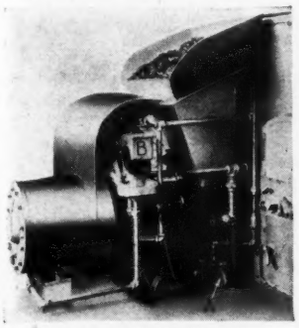
Recent improvements to this chain-grate stoker include a new type of drive, a take-up indicator and a system of cooling the chain. Three worm-and-gear reductions mounted in series and driven by a direct-connected motor having a wide speed range comprise the new drive. The complete drive is integral with the front drive-shaft of the stoker and moves forward or backward as the chain take-up bolts are adjusted.

The take-up indicator for checking alignment of the front drive shaft consists of a pointer bolted to the front shaft bearing and a brass scale attached to the upper part of the stoker-head frame. Alignment is assured by making the two pointers indicate the same reading on the scale.

The new system for cooling the stoker chain is particularly important where preheated air is encountered, as it tends to eliminate expansion and warping from excessively hot chains. There is a section box imme-

diately back of the front drive sprocket. The front vertical face of this box is provided with a series of holes through which air can pass boiler room air through dampered openings in the stoker-front casing.

Illinois Stoker Company, ... ton, Ill. June 18, page 1015.



Steam-Driven Stoker Unit

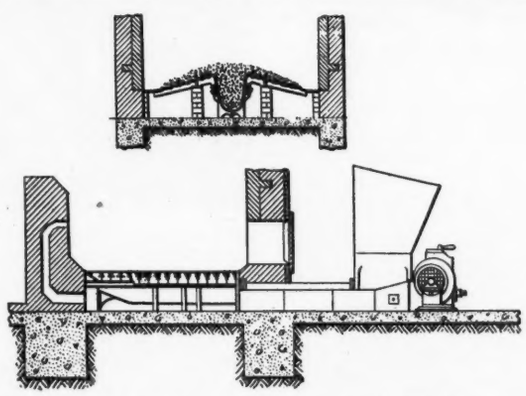
This steam-driven stoker unit consists of a steam-operated Jones side-dump or standard stoker, turbine-driven forced-draft fan and a poppet valve for operating the stoker. The poppet valve is on the ram case of the stoker and is belt-driven from the fan beneath.

A regulating valve is used to control the flow of steam to the turbine in accordance with the steam output, and this, in turn, controls the speed of the poppet valve, which regulates the number of strokes of the stoker plunger per hour. In this way the rates or air and coal supply are automatically regulated.

Riley Stoker Corporation, Worcester, Mass. May 7, page 759.

Self-Contained Unit-Type Stoker

Self-contained and automatically controlled, this unit-type stoker is designed especially for



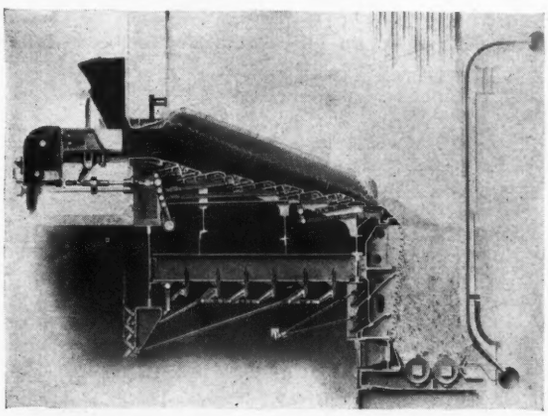
use with boilers having from 750 to 2,500 sq.ft. of heating surface and for application to existing boilers with little or no alteration to the furnace. The complete operating unit consists of a totally inclosed motor, ball-bearing gear-reduction unit and a forced-draft fan mounted on a common cast-iron bedplate placed at the front of the stoker. The rear plate of the gear-reduction unit is bolted to the retort assembly.

A control dial on the top cover of the speed reducer shows the amount of fuel being fed. Eight speeds are provided, which gives a range of feeds from 100 lb. per hour to maximum. An automatic control designed to maintain any wanted steam pressure within two pounds and readily adjustable to any range can be furnished.

General Stoker Corporation, 570 Lafayette St., New York City. Aug. 27, page 348.

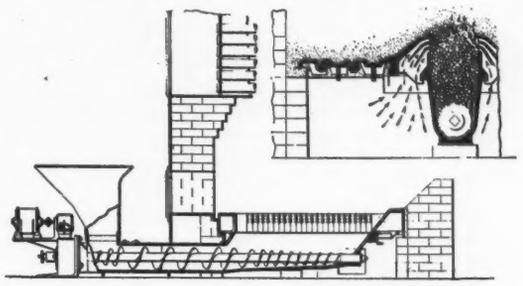
Multiple-Retort Stoker of Improved Design

In this new multiple-retort stoker practically the entire area of each retort has been made active underfeed area, which tends to give even fuel distribution over the entire grate surface. All parts subject to



wear are easily renewable, and all parts subject to burning can readily be replaced.

Design of the ram box allows the depth of the retort to be proportioned to the length of the stoker. This is accomplished by adding tuyeres at the top of the retort instead of at the bottom, as was formerly the practice. The stroke of the auxiliary rams, of which there are several in each retort, is variable, and separate adjustments may be made on each. The amount of motion of all the rams in each retort may be changed simultaneously by a hand-wheel at the front of the stoker.



Grate bars at the end of the stoker have a variable travel and move in sections. The motion of these bars is opposite to the direction of the auxiliary rams, and that serves to clear the ash more effectively from the end of the stoker.

Dump grates are usually installed on the smaller sizes, while clinker grinders are standard for the larger sizes. Zone control of air pressure is afforded by separate air compartments extending across the width of the stoker. The amount of air pressure may be suited to the thickness of the fuel bed directly over any particular air compartment. Also, air may be admitted through tuyeres, grate bars, sidewall tuyeres and either through dump grates or walls of the grinder pit.

Combustion Engineering Corporation, New York City. Feb. 19, page 322.

Underfeed Stoker for Small Boilers

A single-retort unit, this stoker is adaptable to practically any type of boiler generating from 500 to 6,000 lb. of steam per hour. The retort is made in three sizes, with 24, 36 or 48 in. of tuyere length, and the over-all retort assembly in the firebox in each case is approximately 20 in. longer. Maximum coal-burning capacities are, respectively, 400, 700 and 1,000 lb. per hour.

An important feature is the design of the screw conveyor, which is turned continuously by a motor through a speed reducer, with speed variation to regulate the amount of coal fed to the fire. The conveyor is divided into three stages having different diameters and lengths of pitch, which construction tends to prevent binding and clogging and reduces the power requirements of the stoker.

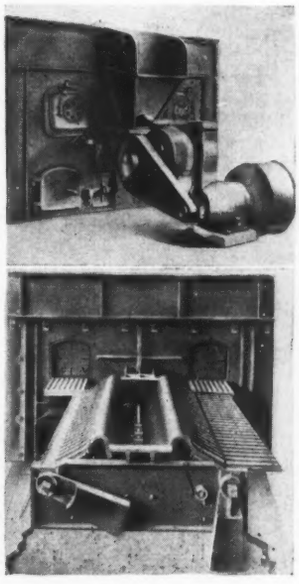
Air for combustion is introduced through tuyeres having 3½ sq.in. of air-cooled surface to 1 sq.in. exposed to the heat of the fire. Control of both the stoker and fan motors in unison is effected by a pressure or thermostatic regulator. Overload and short-phasing protection are provided for each motor, so that if either unit is overloaded from any cause the main switch will open to stop both machines.

Modern Coal Burner Company, Chicago, Ill. Aug. 13, page 262.

Multi-Zone Underfeed Stoker

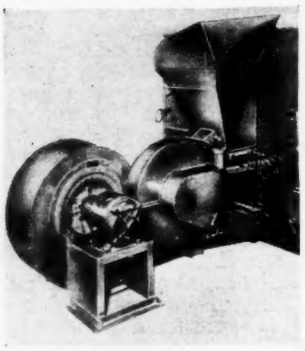
Especially adapted to burning coking and non-coking bituminous coals, this multi-zone underfeed stoker is suitable for use with boilers ranging from 500 to 3,000 sq.ft. of heating surface.

Coal is fed to the single retort of the stoker by a ram



fitted with an adjustable connecting rod, giving a ready means of regulating the amount of coal fed by the plunger. In the retort coal is disturbed by shoes operated from an extension of the ram, the movement of the shoes being readily adjustable. Protection against breakage in the feeding mechanism is provided by a specical friction clutch incorporated in the stoker drive. Special dampers are arranged to zone the air to the retort tuyeres, grate bars and dump plates for proper combustion and burning out carbon in the refuse.

McClave - Brooks Company, Scranton, Pa. July 16, page 103.



New Drive for Jones Stoker

In the arrangement of the drive shown for Jones side-dump or standard stokers the fan and motor are out in front of the stoker where they are readily accessible, and the motor drives the stoker through a mechanical drive which has a coal-feed range bteween 60 and 6,000 lb. per hour. This drive also lends itself to automatic control, the speed regulating mechanism and a damper in the air duct being connected to a regulator operated from the steam pressure.

Riley Stoker Corporation, Worcester, Mass. April 2, page 559.

Motor Drive for Type E Stokers

For installations where steam drive would be impractical for driving the type E and type K underfeed stokers this motor drive has been developed. It consists of a double worm-gear reduction unit and a Reeves variable-speed transmission. The transmission is driven by a silent chain from the motor. On the opposite side, is a hand-wheel for adjusting speed changes. The ratio of speed change is from 1 to 8. Twin connecting rods transmit power from the crankshaft to the under side of the pusher block of the stoker. A shear key protects the stoker mechanism from breakage.

When a steam-pressure regulator is used for automatic control, a lever is substituted for the hand-wheel control of the variable-speed device. The drive has been designed so that either high- or low-speed motors can be used.

Combustion Engineering Corporation, New York City. June 25, page 1056.

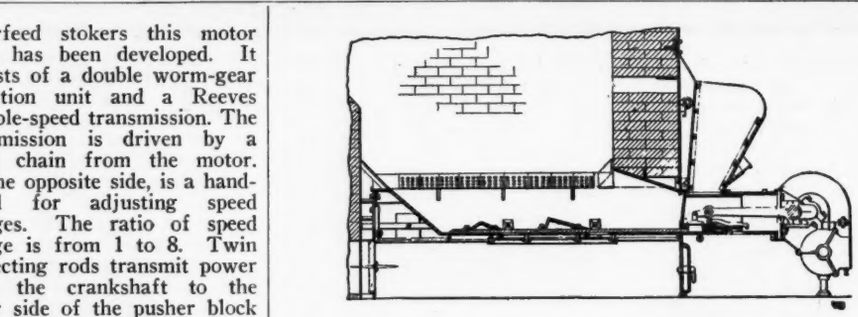
"Straight-Line" Stoker Drive

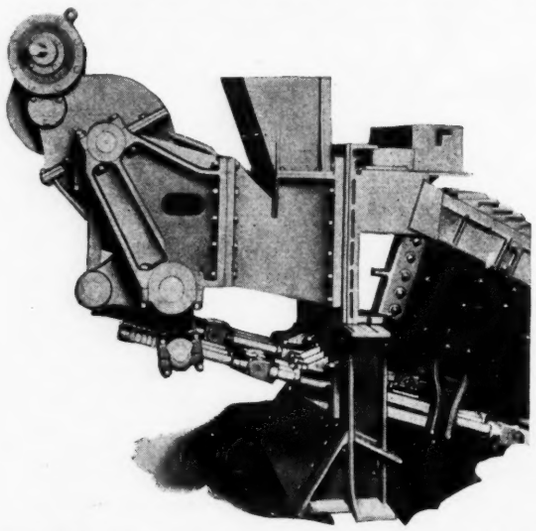
This "straight-line" stoker drive is designed to eliminate angular thrust on the coal-feeding rams and distributing pushers of the stoker. The coal-feeding ram is driven off the crankshaft by a connecting rod that actuates a three-point steel bell-crank lever mounted on a jackshaft. The ram is joined to an arm of the bell crank by a short connecting rod which imparts nearly a horizontal force, eliminating the vertical component of the force produced by the usual drive. The other arm of the bell crank operates the distributing ram by rods that are brought out at a convenient point at the front of the stoker. On these rods are horseshoe collars for adjusting the length of stroke. The outer and inner extreme collars are fastened to the rods by shearing pins which shear in the case of obstruction on either the outward or the inward movement of the rods. Bronze bushing are used in the bearings' surfaces and removable cast iron liners are used in the boxes.

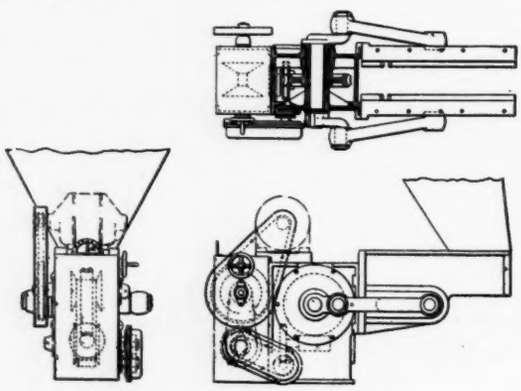
For long stokers where individual control of each pusher is required from the front of the stoker additional rods are used.

At the points where the rods enter the windbox, airtight gland seals prevent the escape of hot air. The rods are supported at these points by cast iron guide bearings which also form packing boxes for scaling the wind box.

American Engineering Company, Philadelphia, Pa. July 2, page 25.







Side-Dump Single-Retort Underfeed Stoker

This side - dump unit - type stoker is made in two grate lengths and four grate widths, giving six different grate areas, with coal-burning capacities up to 2,200 lb. per hour. The space under the stoker is divided into three compartments. The central compartment is supplied with air from the forced-draft fan, while the other two compartments serve as ash pits.

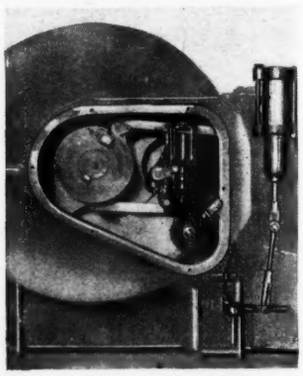
A reciprocating ram and a pusher plate distribute the fuel, the rate being varied by changing the stroke of the plate in relation to that of the ram. The gear-box is equipped with roller bearings, and a safety clutch prevents damage to the feeding mechanism.

Unit-type stokers are driven by a motor which is built into the stoker, but a chain drive is available where the stoker is installed with remotely located forced-draft equipment.

Dayton Stoker Company, Dayton, Ohio. July 23, page 142.

Automatic Control for Stoker Drive

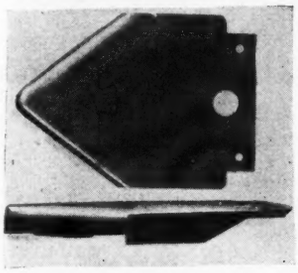
A special device for automatically controlling the air and fuel supply when using the "Riflex" mechanical drive with Jones stokers is illustrated. It consists of a master valve connected by a quarter-inch pipe to a small hydraulic power cylinder on the stoker drive. A master valve controls the position of the piston in the cylinder, which regulates the rate of coal feed and air supply through its connections to the automatic device of the stoker drive and the shaft of the damper in the air duct. As the coal feed and air supply are tied together, a definite ratio of air and coal is maintained.



Riley Stoker Corporation, Worcester, Mass. May 21, page 839.

Renewable Nose Piece for Stoker Tuyeres

With the two-piece block illustrated, a renewable nose piece is readily dropped into place without changing the en-

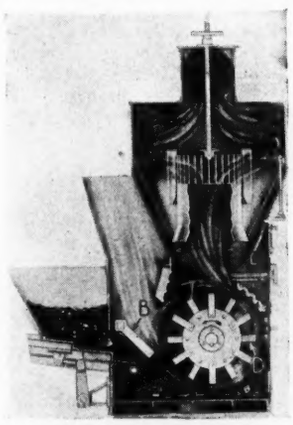


tire block or dismantling the complete row on the side bar. This tends to greatly facilitate the work and lessens materially the cost of renewing burned sections.

American Engineering Company, Philadelphia, Pa. April 2, page 558.

Unipulvo Underfeed Pulverizer

A reciprocating shoe 24 to 30 in. long, extending the full width of the grinding chamber comprises the feeder in this pulverizer. The entire bottom of the coal hopper moves, and the opening into the mill is 6 to 8



in. high to take care of any oversize lumps up to 6-in. cubes and to feed the coal regardless of its character and condition. Means is provided for regulating the position of the stroke of the feeler bars to obtain any desired depth of the coal bed.

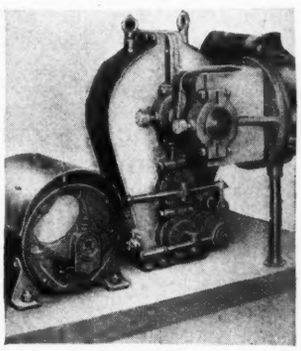
With the mill fan mounted on the same shaft as the beater rotor and driven by the same motor, the machine is a completely self-contained unit, requiring no auxiliary equipment to supply air for combustion. Provisions are made for regulating the intensity of the vortex action in the separating chamber, so that close regulation of the fineness can be maintained.

Within the turbulent type of burner used with the mill is a whirler unit whose function is to change lineal velocity to vortex action as the fuel-air mixture leaves the burner. Adjustment of the blades on this whirler unit makes possible practically any desired flame pattern or intensity of vortex. The pulverizer is made in sizes that range in capacity from 1,000 to 10,000 lb. per hour.

Strong-Scott Manufacturing Company, Minneapolis, Minn. April 16, page 639.

Reduction Gear for Single-Retort Stokers

The accompanying illustration shows a triple-reduction gear unit for driving single-retort stokers. It comprises a com-

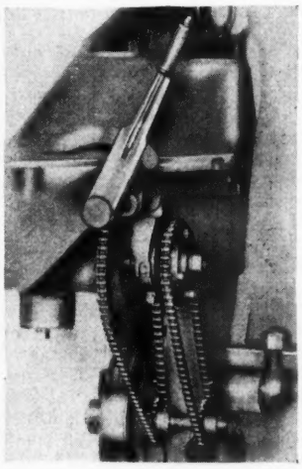


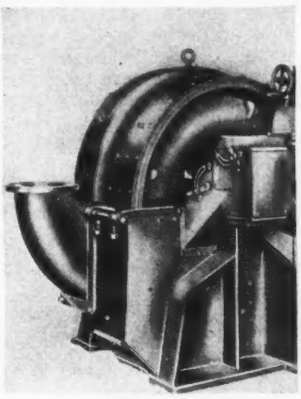
bination of spur and helical gearing with tapered roller bearings, and is arranged for splash lubrication. It is fitted with a two-speed transmission and a clutch of the multiple-disk type. With the driving motor running at 1,000 r.p.m., the gear box turns the stoker cranks 7 to 13 r.p.m., as desired.

Westinghouse Electric & Manufacturing Company, Philadelphia, Pa. May 14, page 795.

Improved Unit Pulverizer

Finer pulverization, reduced power consumption and higher capacities from a given machine are the result of important changes made to the "Atrita"

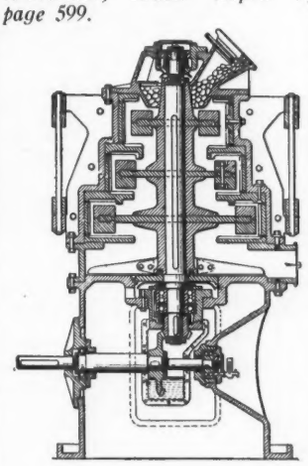




unit pulverizer. The outer casing has been increased in size to accommodate a heavy steel horseshoe band to which are bolted saw-tooth-shaped castings that break up the circular motion of the coal and primary air. Where the most severe service takes place the castings are made of a special wear-resisting material.

Other improvements include the adoption of roller bearings where practical and a change in the feeder drive from the countershaft to the slow-speed worm shaft. The clutch has been increased in size and provided with a positive neutral stop. The magnet of the magnetic separator is now enclosed in a brass housing with only the pole exposed.

Riley Stoker Corporation, Worcester, Mass. April 9, page 599.



Improved Vertical-Type Pulverizer

This improved pulverizing unit comprises a vertical step-shaped casing split vertically and embodying three pluverizing chambers of different diameters. The pulverizing element consists of three steel disks mounted on a vertical shaft, each disk having rigidly connected to it pulverizing hammers of chrome-nickel alloy. Bolted to the sides of the casing of each stage are circular corrugated side plates.

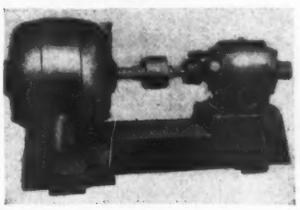
The vertical shaft is mounted in ball bearings, each of which has a small pump disk which forces the oil into the top of the ball raceway, and it returns to the disk chamber through the bearing.

In operation both impact and attrition grinding action takes place, and in each stage the material has to reach a given state of pulverization before it is air-floated out to the next stage. The unit is made in sizes ranging in capacity from 3,000 to 7,000 lb. coal an hour.

George F. Pettinos, 1206 Locust St., Philadelphia, Pa. June 18, page 1017.

Oil Mill Eliminates Sludge

To obviate the necessity of cleaning the accumulation of sludge and heavy oil particles

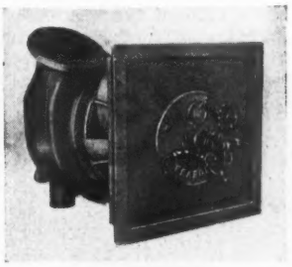


from the bottom of fuel oil tanks the oil mill illustrated has been developed. The mill is connected in the oil line between the pump and the burners and is designed to mix the sludge thoroughly with the oil on its way to the burners. In this way, by simply stirring up the sludge in the tank so that it will pass to the pump, it is possible to use all of the oil, as well as to keep the tanks clean, without periodic draining.

Volcanic Specialties Company, Alliance, Ohio. Aug. 6, page 223.

Burner for Standard and Waste Fuels

A combination burner designed especially for certain waste fuels alone or in combination with standard fuels, such as pulverized coal, oil and natural gas, is illustrated. Among the liquid waste fuels

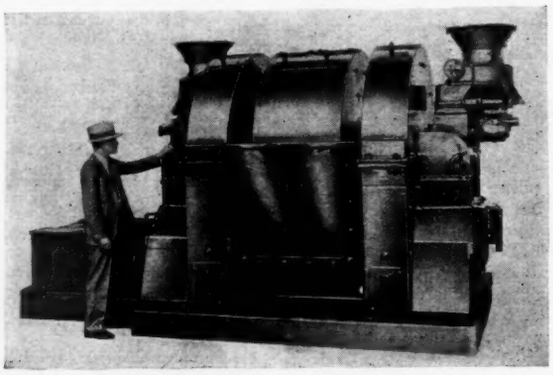


handled are 100-deg.-melting-point petroleum pitch and heavy residues, acid sludge, neutralized sludge and acid tar. Fuels containing as high as 30 per cent base settlings and water and 5 per cent sediment by ex-

traction can be handled satisfactorily.

The illustration shows a three-fuel burner equipped with a 4-in. insulated front for use with preheated air.

Peabody Engineering Corporation, 110 East 42nd St., New York City, Jan. 28, 1930, page 151.



Duplex Coal Pulverizer of Large Capacity

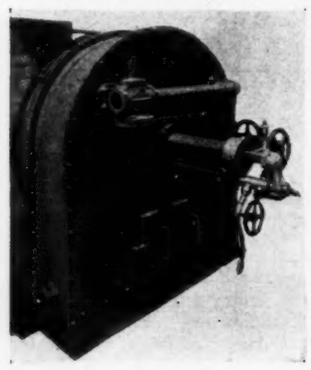
In this duplex-unit coal pulverizer of 15,000 lb. per hour capacity two single No. 5 "Atrita" units are assembled on a common shaft, with a feeder at each end and the discharge fans in the center.

In other details the new pulverizer follows closely the single unit and embodies such features as housings of welded construction, heavy-unit cast-segment pulverizing pegs, roller bearings, and four-speed transmissions in the coal feeder drives.

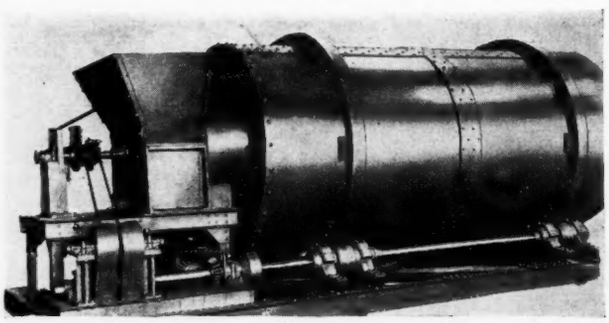
Riley Stoker Corporation, Worcester, Mass. Sept. 10, page 420.

Large-Capacity Burner for Oil and Gas

To obviate the usual multiplicity of oil or gas burners on large boiler units, the type "D" large-capacity burner illustrated has been developed. It is built in units capable of supplying boilers ranging from 15,000 to 25,000 sq.ft. of heating surface. The oil burner itself is made either in the steam-atomizing type, throwing a hollow cone spray, or in the regular mechanical or pressure type. Hand wheels effect the various adjustments of the air-inlet shutter and burner position with respect to furnace opening. When the burner is used with other fuels, such as bagasse or hogged, it can be completely shut off from the furnace with a refractory closing member, thus rendering unnecessary the use of high-temperature metal.



Engineer Company, 17 Battery Place, New York, N. Y. Jan. 28, 1930, page 154.



Rotary Sludge Burner

A rotary burner designed to not only dispose of the unusable viscous byproducts, such as acid coke and some of the other sludges, but also to utilize the heat of burning in boilers or stills is illustrated. In construction it resembles a small rotary kiln consisting of a cylindrical steel shell lined with firebrick. It is mounted on wheels in front of a boiler furnace in a nearly horizontal position, and rotated slowly by a motor or engine drive.

As the material falls from the screw conveyor in large and small pieces and also in the liquid state, high-pressure air or steam jets blow on it at an angle of about 45 deg. The air from these jets produces a hot zone about three feet long at the feed end of the burner. In this zone the volatile portions are vaporized and burned as gases in the early part of the cycle. By the rotation of the burner the material is continuously agitated and the fuel is brought into contact with the hot refractory lining, causing it to crack to gas and coke.

To burn the gases, air is admitted above the fuel line, passing from a forced-draft fan through a series of vanes that give it a spiral motion. If preferred, the burner can be operated as a gas producer and the gas generated and burned in the boiler furnace proper by the admission of sufficient secondary air.

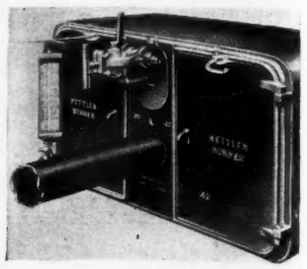
For still and boiler-heating purposes burners ranging in capacity from 500 to 4,000 lb. of sludge per hour are available. The burner has a shell $\frac{1}{4}$ in. thick, 6 ft. in diameter and 15 ft. long. The speed of rotation is 20 revolutions per hour.

Illinois Stoker Company, Alton, Ill. June 25, page 1057.

Combination Gas and Oil Burner

The combination entrained-combustion gas burner illustrated is designed to operate under a range of gas pressure from $\frac{1}{16}$ in. W.G. up to 20 lb. It has a wide range of ratings, as follows: $\frac{1}{16}$ in. W.G., 1,050 cu.ft. of natural gas per hour; at 3 oz. pressure, 6,700 cu.ft.; at 6 oz., 10,300 cu.ft.; and at 10 oz. pressure, 13,400 cu.ft. of gas per hour. The size of the gas inlet is 3 in., and the overall dimensions of the burner are 17$\frac{3}{4}$x34 inches.

The burner consists of three parts, a cast-iron housing, a cast-iron manifold fitted with a series of orifices and a refractory mixing block. The gas manifold has a series of openings (in this case 42), into each of which four nozzles are fitted at an angle of 45 deg. With this construction four streams of gas meet at a central point in the mixing tube and by the impingement of one against the other cause violent agitation of the gas in a core of entrained air. The inner side of the manifold carries a refractory mixing block. A mechanical oil burner is fitted in the center top opening, permitting the use of either



fuel without any changes in the burner proper.

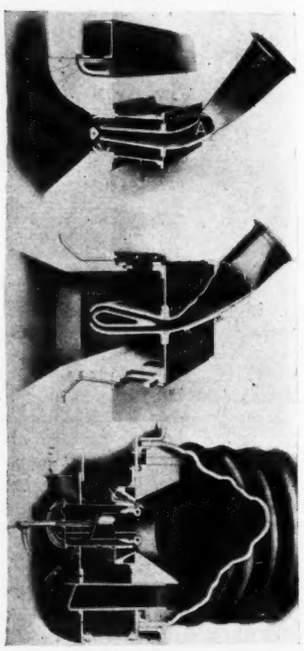
Lee B. Mettler Company, 406 South Main St., Los Angeles, Calif. Oct. 1, page 532.

Burners for Pulverized Coal

In the vortex burner, shown in the top view, primary air and coal enter through a flat orifice and impinge on a V-shaped deflector directly in front of the orifice. As the streams leave the deflector they are met by secondary air supplied under pressure. This intermixing of the streams gives an intense turbulence and short flame.

The burner in the center view is intended for use where secondary air is supplied by natural draft, shutters being provided for the regulation of the air supply.

In the rotary burner primary air and coal are delivered tangentially to a chamber, then through an annular orifice and over a vortex tip, with a rotary notion at a relatively high velocity. The secondary air enters around the outside and is also given a rotary motion. This burner is particularly adapted

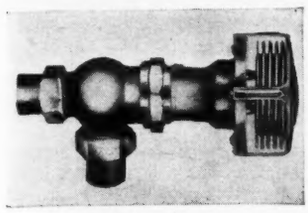


for use with Scotch marine and return-tubular boilers.

Kennedy-Van Saun Manufacturing & Engineering Corporation, 2 Park Ave., New York City. April 16, page 641.

Automatic Radiator Valve

In this automatic radiator valve is combined a packless valve and temperature control unit suitable for use with any



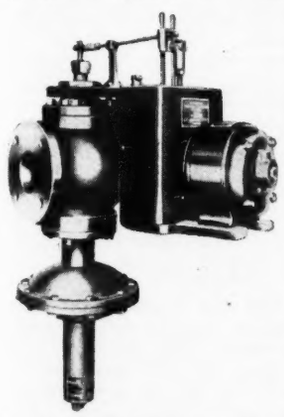
two-pipe steam-heating system utilizing either floor or ceiling radiators. The thermostatic element employs the standard Sylphon bellows, which functions to close the valve or permits it to open in accordance with the heating requirements of the room. A second bellows is connected between the valve disk and bonnet to form a packless valve.

The point at which the valve will open or close is regulated by rotating the thermal unit, maximum rotation being only a fraction of a revolution. Unions are provided on steam and radiator connections to facilitate installation on an existing system.

Fulton Sylphon Company, Knoxville, Tenn. Jan. 14, 1930, page 69.

Zone Heat Control Valve

The control valve illustrated functions as a reducing valve and is designed to hold any required steam pressure on any particular zone. Each zone control valve is operated by a mercoid contactor or other thermostat located centrally in the zone supplied by the valve. The thermostats have an operating range of 56 to 80 deg. and are designed to operate on a dif-



ferential of 2 deg. at any point within the range mentioned. The valve can also be operated by push-button remote control from the engine room or other point in the building.

Automatic contactors for the operating valve can be of any two-circuit type, such as room thermostats, water thermostats, pressure controls and fluid-level controls. The valve can be furnished in standard pipe sizes of 1 to 12 in. suitable for supplying from 300 to 20,000 sq.ft. of radiation.

Illinois Engineering Company, Chicago, Ill. Aug. 27, page 347.

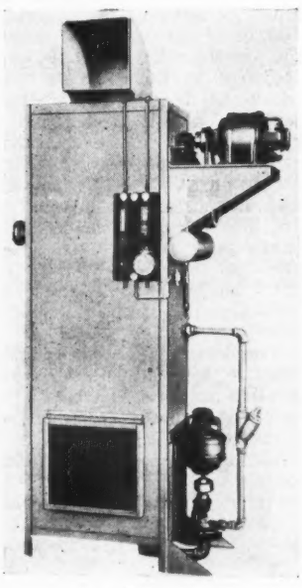
Air Conditioner With Automatic Control

Designed as a compact and self-contained unit complete with automatic control, this air conditioner is adaptable to a number of different services, including heating at any given temperature and relative humidity; cooling with the use of refrigeration or cold well water; furnishing moisture or dryness in air for processing, as well as cleaning and furnishing ventilating air.

The heating element is an all-aluminum non-corrosive surface with cast aluminum heads designed for 150-lb. working pressure. Tube fin coils are used, with the fins knurled on the pipe. Pressure for the water at the spray nozzle is supplied by a vertical motor-driven pump mounted on the side of the unit. Temperature and humidity controls are mounted on a single panel at the side of the heater.

Units can be supplied in twelve sizes, ranging from 3,250 to 12,000 cu.ft. of air per minute saturated at 60 degrees.

Niagara Blower Company, 673 Ontario St., Buffalo, N. Y. Aug. 27, page 348.

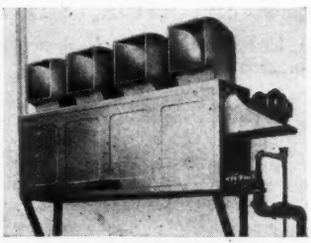


Heating and Ventilating Equipment

Unit heaters that wash and humidify, units with multiple vertical and horizontal louvers to give better air distribution, dual control to prevent overheating and conserve steam, and ventilating fans designed especially for silent operation are among the contributions to this field.

Industrial Unit Heater

Two units, designated as "Lowboy" and "Highboy," comprise this line of industrial heaters which can be installed in any position, vertically, horizontally or inverted. Each unit



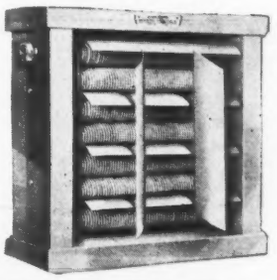
is also suitable for floor or wall bracket mounting or for ceiling suspension.

The multi-fan rotors are all mounted on one shaft, with a ball bearing on each end. Heating elements are built up of "Aerofin" tubing suitable for pressures up to 150 lb. The heater elements can be removed through the end plate at either end of the unit.

Motor bracket end plate and the outboard end plate are interchangeable, so that the drive can be placed on either end of the unit.

When mounted upright, the "Highboy" has an over-all height of 90 in., and the width is variable from 61 to 100 in. for the three sizes manufactured. "Lowboy" has a height of 60 in. over-all, the other dimensions being the same.

Buffalo Forge Company, Buffalo, N. Y. Feb. 12, page 285.

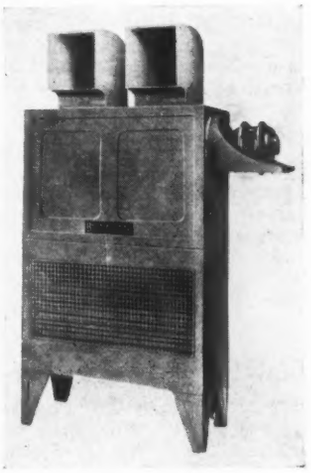


Heater With Two-Speed Fan

Employment of a two-speed motor to drive the fan, and vertical louvers to break up the air flow and spread it over a wider area are features of this unit heater. It is made in three types. In No. 1 the motor operates at 750 and 950 r.p.m. No. 2 operates at 870 and 1,170 r.p.m., and No. 3, a cabinet model, at 350 and 750 r.p.m. No. 1 and No. 2 are designed to be hung from ceilings, beams or walls, steel hangers being supplied.

All models are equipped with high-pressure Aerofin heating elements suitable for steam pressures up to 250 lb.

B. F. Sturtevant Company, Boston, Mass. Nov. 12, page 768.



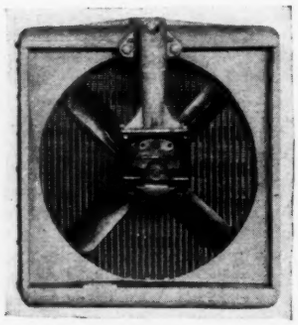
Unit Heater That Washes and Humidifies

With the exception of the humidifying section, this unit, designated "Wetboy," is similar in detail to the other two models of heaters, the "Highboy" and "Lowboy," put out by the same company. Air is drawn through the unit by centrifugal multi-rotor fans, each in its own fan housing. Heating elements are of Aerofin tubing, suitable for pressures up to 200 pounds.

The washing and humidifying element consists of a revolving drum propelled by the air current through the unit. The scrubber plates on the drum continually drip in the water tank and provide wetted surfaces through which the air must pass twice. No auxiliary or circulating pump is used.

The dirt taken from the air settles into the tank, from which it is removed at intervals by flushing.

Buffalo Forge Company, Buffalo, N. Y. Dec. 17, page 978.



Units for Heating and Ventilating

A line of unit heaters suitable for combined heating and ventilating service and in which either steam or hot water can be used is illustrated. The heating sections consist of flat vertical copper tubes designed for maximum heat diffusion.

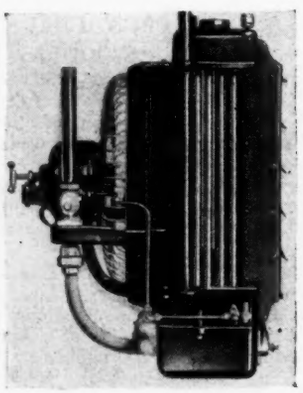
Air is circulated over the heating unit by a motor-driven fan, the largest unit having a ⅛-hp. motor. A three-speed motor can also be furnished, the top speed being used for rapid increase of room temperature and the lower speeds for normal operation.

Thermostatic control can be provided. The units are comparatively light in weight, the largest, only 125 lb., occupying a space of less than 3 cu.ft.

Young Radiator Company, Racine, Wisconsin. May 14, page 795.

Gas-Fired Unit Heater

This gas-fired unit heater, known as the "Humphrey Industrial Unit," has a capacity



equivalent to 400 sq.ft. of ordinary steam radiation and is equipped with a fan delivering 1,800 cu.ft. of heater air per minute.

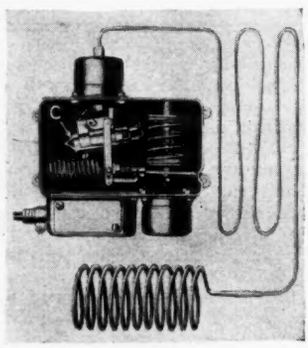
The heating element consists of a bank of gas burners above which is a battery of brass-tube radiators. A fan driven by a ⅛-hp. motor is mounted behind the tubes.

Control is maintained by a thermostat, and the motor is equipped with a governor which turns the gas on and off as required to maintain even temperature. Pilot lights on each side of the burner control a simple thermostatic switch that automatically prevents the motor from operating in case the pilots are extinguished.

General Gas Light Company, Kalamazoo, Mich. March 19, page 483.

Dual Control for Unit Heaters

This dual control for unit heaters combines two instruments in one: automatic control of room temperature by starting and stopping the fan motor, according to changes in air temperatures, and an automatic cut-off which stops the motor, or



prevents it from starting, in case the heating surface of the unit is cold.

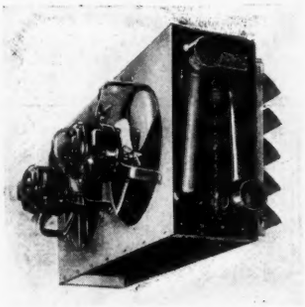
Two thermostatic elements are used, each operating the same mercoid switch. The lower element is actuated by the temperature of the air which is drawn over it by the fan. The upper element is equipped with a flexible thermostatic tube, four feet of which is wound around the condensation or drip line. As long as this pipe is cool, the switch is locked in position with the circuit broken and a change in the air temperature cannot start the motor. When steam fills the heating surface and the drip pipe warms to 160 deg. the upper element expands and releases the lock, allowing the lower element to start and stop the motor to maintain the desired temperature.

The control is especially suitable for application to existing installations as it can be placed on the side of the heater casing adjacent to the motor circuit, obviating the need for additional wiring.

American Radiator Company, 40 West 40th St., New York, N. Y. January 21, 1930, page. 115.

Single- and Duplex-Fan Type Heaters

Built in the single- and duplex-fan types, the unit heater illustrated is made in five sizes, with a selection of three constant



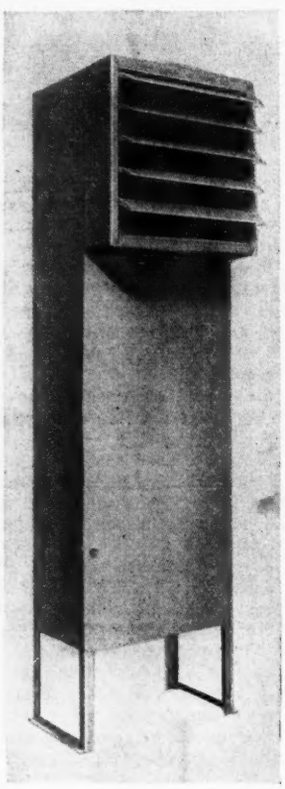
speeds per size, 1,750, 1,150 or 870 r.p.m. Multi-speed motors are also available in each size, to give quieter operating speeds and a high reserve for the warming-up period.

For automatic operation a totally inclosed, externally operated across-the-line switch of the quick-break safety type, with thermal overload cut-out, is used in connection with a standard Mercoid thermostat. The heaters are adaptable to use with any electric current, floor recirculating boxes, or horizontal outside air intake boxes.

United States Radiator Corporation, Detroit, Mich., Dec. 24, page 1012.

Unit Heater in Recirculating Box

In the illustration is shown a heating unit incorporated in a

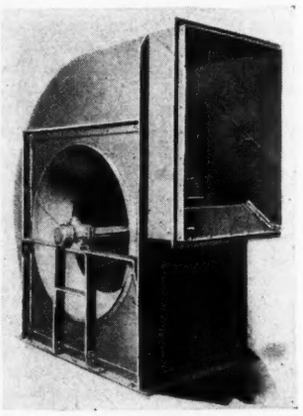


recirculating box designed for floor mounting. This makes it flexible and convenient for a wide range of uses, as it can be placed in any location without further support. Heating sections consist of flat vertical copper tubes with brazed flat copper fins. The tubes are also brazed to the header plates. Thermostatic control can be provided. The units are put out in four sizes to take care of a wide range of heating requirements.

Young Radiator Company, Racine, Wis., Oct. 1, page 533.

Ventilating Fan Gives Quiet Operation

In this fan designated Silex, the housing is a rolled-up evase stack designed to convert air



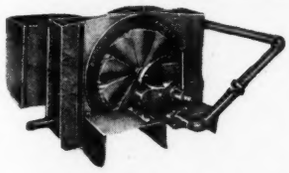
velocity into static pressure. The discharge cone is carried out beyond the casing to improve conversion efficiency and to provide a quiet, streamline fan cut-off.

The rotor of the fan has double curved blades with their tip or outer edge inclined backward. In addition to giving a lower air velocity at the tip, this results in quiet operation, gives a rigid blade and strong wheel construction. Single-width fans are available in capacities from 875 to 200,000 cu.ft. of air per minute. They can also be furnished with double-width housing and rotor, suitable for installation where headroom is limited.

Buffalo Forge Company, Buffalo, N. Y. Oct. 15, page 611.

Turbine Drive for Heater Blower

In this small steam-turbine-driven blower unit heater the turbine drives the fan to circulate the air over the coils, and the exhaust steam from the turbine is used as the heating medium in the coils. The turbine is generally so arranged that it will consume for power about two-thirds of the steam required for the heating element, the remaining third of the steam being bypassed through



the turbine by a valve on the casing. A separate speed control is also provided.

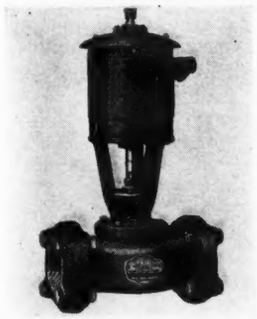
In the unit shown, the exhaust from the turbine is piped to the top of the heater coil and the condensation is taken off on the opposite side near the bottom.

Murray Iron Works Company, Burlington, Iowa. June 11, page 977.

Circulating Pump for Hot-Water Systems

To provide a positive circulation in hot-water heating systems and thereby increase the efficiency of the complete system this vertical motor-driven circulator has been developed.

The unit is installed on the return line at a point near the

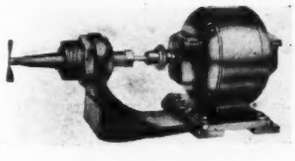


boiler, and provides a definite circulation through the boiler. It is available with either a 110- or 220-volt motor and in 2- and 3-in. pipe sizes, having capacities of 30 and 70 gal. a minute, respectively. This is sufficient to supply 2,500 and 6,000 sq.ft. of radiation.

H. A. Thrush & Company, Peru, Ind. Nov. 5, page 732.

Circulator for Heating Systems

Although developed primarily for increasing the circulation in heating systems, this motor-driven circulator is equally well adapted to a number of uses in the industrial field. It consists of a propeller direct connected to a motor through a flexible coupling. The complete unit is supported from the bearing block, which is made to screw into a standard pipe fitting. The bearing is fitted with a hard-



rubber sleeve, and water is used as a lubricant.

In the industrial field the circulator is particularly adapted to circulating brine in cooling tanks, cooling water in large air-compressor units, water in large-capacity service or process-water-heating systems and similar services. The circulator is available in a wide range of sizes from 1¼ to 12 in. Sizes 1¼ to 8 in. are screwed for standard pipe fittings, and the 10- and 12-in. sizes are mounted in flanged cover plates.

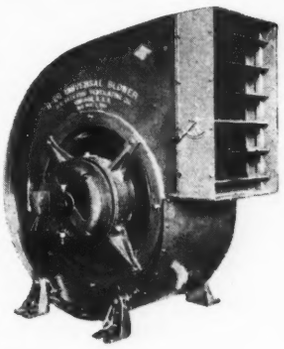
Rochester Circulator Sales Division, 429 Ravenswood Ave., Rochester, N. Y. Sept. 24, page 499.

Variable Air Controller

To provide variable air control without a variable-speed or slip-ring motor to drive the blower, a louvered damper is used on this blower discharge.

The blower is designed for direct connection to constant-speed motors, control of the air being accomplished by limiting its discharge by means of the damper. The damper opening is regulated from a quadrant control handle or from the side of the blower housing. Units are also available with the damper arranged for remote control and time-switch operation.

Ilg Electric Ventilating Company, 2841 North Crawford Ave., Chicago, Ill. Oct. 15, page 610.



Mechanical Transmission

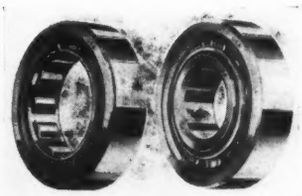
Bearings; flexible couplings; speed reducers; V-belt drives and clutches.

Single-Row Ball Bearings

Designed to withstand heavy thrust and radial loads at high speeds, this single-row annular ball bearing is available in three series, light, medium and heavy, ranging for the lighter series from 0.3937 in. to 4.7244 in. bore

and for the heavy series from 0.6693 to 3.9370 in. bore. Both the raceway and the balls are made of high-carbon chrome-alloy steel, and the retainer is of riveted steel.

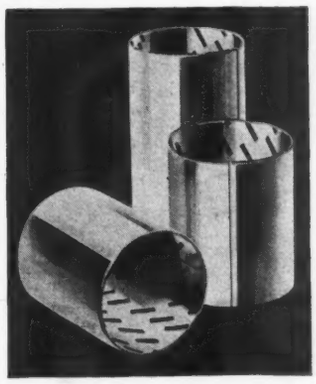
Hoover Steel Ball Company, Ann Arbor, Mich. Oct. 1, page 532.



Radial Roller Bearing for Heavy Duty

This new line of bearings, which uses solid rollers, is not intended to replace the standard Hyatt bearing, which uses spirally wound rollers, but is offered as a supplement to it, for positions in which space limitations exist and loads beyond the capacity of ball bearings must be sustained. The rollers are permanently retained with the outer race, the inner race being separable. A separator floating on the rollers spaces them properly, and end rings keep them in alignment. Rollers and races are made of a special chrome-nickel alloy steel and end rings are of Vanadium steel.

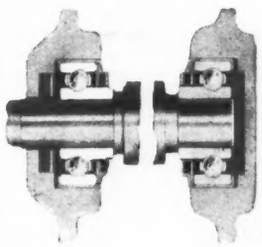
Hyatt Roller Bearing Company, Newark, N. J. Sept. 17, page 459.



Self-Lubricating Bearing

This self-lubricating bronze bearing is designed to provide for a uniform area of bearing surface on the pressure line and insure an efficient distribution of lubricating compound. Indentations in the metal at an angle of 30 deg. serve as an effective receptacle for the lubricating compound. The new bearing is particularly suitable for use on parts of equipment subject to intermittent or periodical operation.

Johnson Bronze Company, New Castle, Pa. Jan. 28, 1930, page 154.



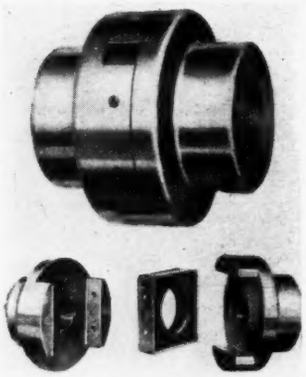
Self-Lubricated Ball Bearings

Designated the N-D-Seal, this self-sealed, self-lubricated ball bearing is made only in the smaller sizes and consists of what is essentially a single-row ball bearing permanently fitted into a metal shell. The shell is shaped on one side of the bearing to contain a felt closure that fits over the outside diameter of the extended bearing inner ring, thus forming an effective seal both for the retention of lubricants and the exclusion of dirt. Outside diameters and bores are standard.

New Departure Manufacturing Company, Bristol, Conn. Dec. 3, page 901.

Flexible Coupling Without Flexible Member

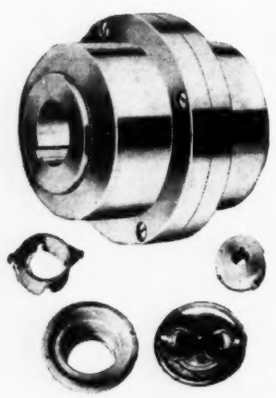
Simplicity of construction and flexibility without the employment of flexible materials are features of this coupling. The two halves of the coupling are identical and interchangeable.



The flange is machined in the face, leaving two jaws between which the floating and connecting member slides and by which the torque is transmitted.

The center floating member is a square hollow casting to each edge of which is fastened a renewable bearing strip of bakelite or a similar non-metallic substance. These strips are the only parts of the coupling subject to wear, and they are readily replaced without dismantling the coupling. The center member is hollow and filled with grease, which is distributed to each bearing surface. The coupling may be assembled from any direction laterally, vertically or head on, final alignment being made by simply applying a straight edge to the top or sides of the couplings. Sizes from ¾- to 8-in. shaft diameters are available.

American Flexible Coupling Company, Erie. Sept 10, page 419.



Coupling With Two Flexing Elements

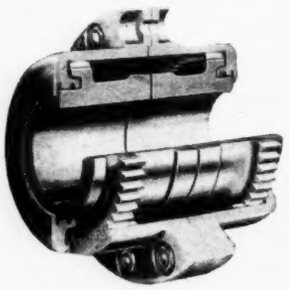
Employment of one or more ring-shaped springs to transmit the load and at the same time give the necessary flexibility between the driver and driven machine is a feature of this coupling. Two smaller rings placed diametrically opposite are used instead of one going completely around the shaft hub, as was the case in earlier models. In each half of the coupling projections on a floating sleeve fit into the openings in the rings, and the pins in the shaft hub, in turn, fit into milled slots in the sleeve. The outer housing does not transmit torque. It serves only to keep the torque members in alignment and as a retainer for the lubricant.

A similar style of coupling is available using four ring-shaped springs instead of two. Bore sizes range from 1¼ to 6 inches.

T. L. Smith Company, Milwaukee, Wis. Aug. 20, page 298.

All-Metal Flexible Coupling

Refinements in design made to this gear-tooth type coupling include the use of a combination dust-proof and centrifugal oiling feature, which is accomplished by a new type double-flange end plate containing within its inner lip a deep felt packing for the exclusion of dust and dirt. The outer section is grooved and contains back



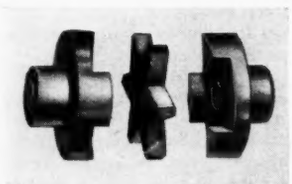
drain holes, which permits lubrication of the coupling while in motion.

By a special process employed in the production of the coupling, each part is heat-treated to specifications, increasing the life of the coupling by giving protection against wear.

The Poole Engineering Machine Company, Baltimore, Md. Dec. 17, page 977.

Star Flexible Coupling

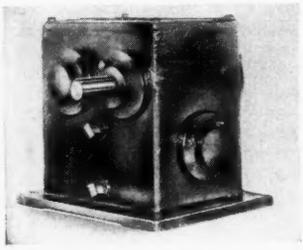
Only three parts are used in this flexible coupling, which consists of two flanged semi-steel castings with three projecting lugs on each half, and a central star-shaped rubber disk. Slope of the lugs is such that the load



on the disk is in compression over a large surface.

Three sizes of coupling are available. They are Nos. ⅝, 1 and 1⅜, having corresponding bores in inches. The diameters are 2½, 3½ and 4½ in., and the over-all widths are 2 5/16, 3 3/16 and 4 1/16 in., respectively.

W. A. Jones Foundry & Machine Company, 4401 West Roosevelt Road, Chicago, Ill., June 11, page 977.



Large Ratio Speed Reducer

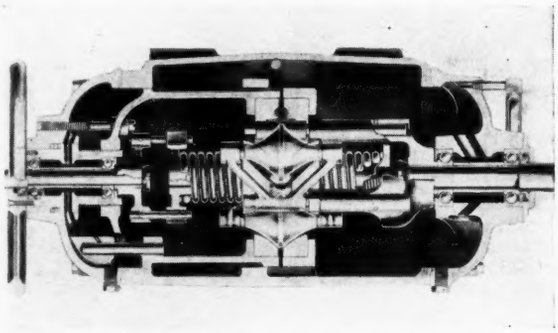
Speed reduction ratios from 100 to 1 up to 2,500 to 1 are obtainable in this reducer. The mechanism consists of a double worm-gear drive having the driven and driving shafts parallel. It is particularly suitable for light conveyor, coal feeder and similar drives, where a large reduction is required.

Ball thrust bearings are fitted at each end of the two worm shafts. Dimensions are 7⅞ in. high, 7½ in. wide, and approximately 11 in. from end of driven shaft to end of driving shaft.

Winifred H. Smith, Inc., Springville, N. Y. March 19, page 483.

Improved Variable-Speed Transmission

An improvement recently made to this variable-speed transmission is the incorporation of high-grade ball-bearing mountings throughout the machine. All sizes and types of the transmission have been equipped with ball bearings at important points. There are two ball bearings supporting the high-speed shaft and two sup-



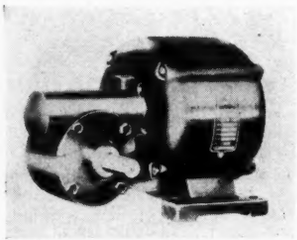
porting the variable-speed shaft. In addition to providing smoother operation, proper lubrication of every running part s assured, internal circulation of the oil bath being accomplished through splashing of the revolving parts.

Stephens-Adamson Manufacturing Company, Aurora, Ill. June 18, page 1017.

Small Speed-Reducer

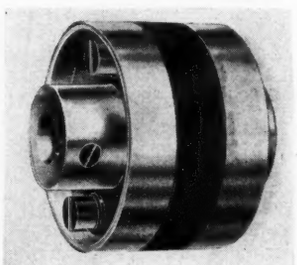
This small speed-reducing power unit is available with motors ranging in capacities up to ¼ hp. and with speed reductions ranging from 20 to 1 up to 50 to 1. Standard gear ratios may be obtained as follows: 20, 26, 32, 34, 38, 40, 44 and 50. With a motor speed of 1,750 r.p.m. countershaft speeds are obtainable from 87.5 down to 35 r.p.m.

Janette Manufacturing Company, 556 West Monroe St., Chicago, Ill. July 9, page 61.



Light-Duty Coupling

Two die-cast flanges of equal diameter, with a rubber centerpiece, constitute this light-duty flexible coupling. Connection of the two flanges is made by four screws, which are screwed

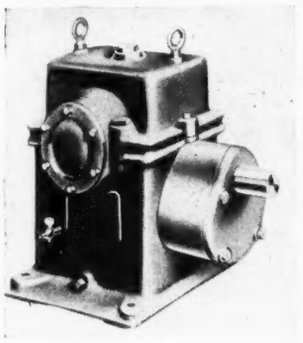


through the flanges and into nuts molded permanently into the centerpiece. The coupling s made with shaft bores ranging up to 1¼ in. in diameter.

Ajax Coupling Company, Westfield, N. J. Aug. 6, page 222.

Reducer With Worm and Helical Gear

Developed to provide greater speed ratios than given by the single-reduction unit, this right-angle reducer consists of a standard single-reduction worm reducer with a set of helical gears mounted on the worm

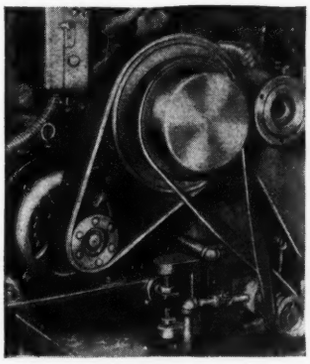


shaft. Helical gears constitute the high-speed element, which is made with four ratios, ranging from 1 to 1, to 4 to 1. It is fitted with anti-friction bearings, bronze worm gear and nickel-steel worm.

Foote Bros. Gear & Machine Company, Chicago, Ill. Sept. 10, page 421.

Leather Belt for Short-Center Drives

Short-center belt drives have been developed in several forms. This belt is of the flat-leather type and designed especially for use on standard pulleys located on short centers, without idlers or tighteners of any kind. It consists of an outside ply of the same company's Slip-Not leather, and an inner ply that is per-



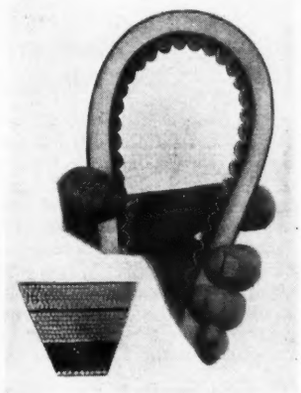
forated. Both are cemented together onto a specially designed center which serves as a cushion and muffler. The perforations tend to cause a suction grip on the pulleys, and this feature combined with the high coefficient of friction peculiar to the leather produces take-hold qualities.

Slip-Not Belting Corporation, Kingsport, Tenn. Nov. 5, page 732.

V-Belt for Short-Center Drive

For short-center drives employing grooved pulleys this belt is especially adapted. It is trapezoidal in cross-section and has a series of tooth-shaped corrugations on its inner surface to provide flexibility and prevent buckling when flexed around the pulley. The outer surface consists of a series of convolute layers of a bias-cut fabric with the ends of the threads exposed to the sides of the pulley grooves to form part of the driving surface. A series of convolute layers of prestitched parallel-cord fabric form the center portion, which is the strength member.

To obtain flexibility without disortion, the compression section or inner layer of the belt is made of rubber and fabric and is corrugated. The belts can be used for almost any application where a short-center drive is required, such as fans,



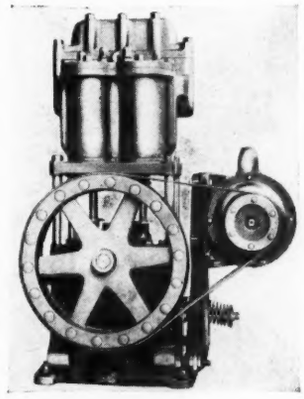
pumps, compressors, conveyors, cement mills, paper mills, etc.

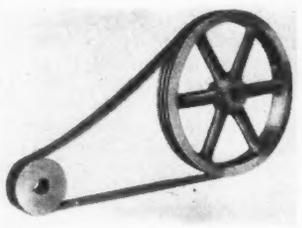
Dayton Rubber Manufacturing Company, Dayton, Ohio. March 5, page 403.

Short-Center Belt Drive

"Uni-pull" is the name given to this short-center belt drive in which the motor is suspended in such a way as to give a uniform tension on the belt. The motor is mounted on a vertical upport pivoted at the lower end, and force exerted by the overhang on the motor causes a constant or uniform pull on the belt. The drive is adaptable for use on a single machine or a lineshaft group and may be mounted on the floor, on the machine, or suspended from the ceiling.

Rockwood Manufacturing Company, Indianapolis, Ind. June 18, page 1016.





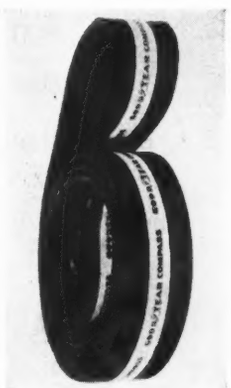
Multiple V-Shaped Belt Drive

Small floor space is required for this drive. The belt is built with an outer jacket consisting of two layers of duck inclosing a core made up of a layer of rubber and several layers of rubber-embedded cords. The cords are laid at the neutral axis of the belt, where there is the least tension or compression. The various elements of the belt are assembled in a mold and vulcanized into a unified structure. Owing to the wedging action of the belts in the grooves and to their elastic qualities, there is no grabbing of the load, and sudden shocks to the driving and driven machines are eliminated. Belts are available in a wide range of lengths and capacities.

Fairbanks, Morse & Company, Chicago, Ill. April 16, page 640.

Endless Cord Transmission Belt

This belt differs from ordinary fabric belts in that it has no splice in the core of cords which



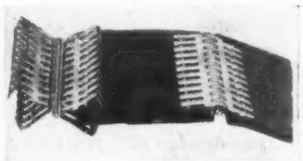
carries the load. The cords are embedded in rubber, and are covered by an elastic, rubberized fabric envelope.

It is practically stretchless, extremely flexible, and much thinner than standard belts of equal power capacity, and is especially recommended for drives on air compressors, vacuum pumps, ice machines and similar equipment, and on short-center and high-speed, small-pulley drives.

Goodyear Tire & Rubber Company, Inc., Akron, Ohio. Nov. 19, page 807.

Flexible Steel Belt Lacing

A complete line of flexible belt lacing called "Steelgrip," made of heat-treated steel, is available for $\frac{3}{16}$ to $\frac{1}{2}$-in. thick belts. The lacing joint is made with a steel rocker pin, composed of two segments, one rocking against the other. It may be used for leather, fabric

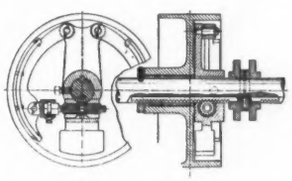


or composition belts, and is readily applied by means of a hammer.

Armstrong-Bray & Company, 28 North Clinton St., Chicago, Ill. Jan. 14, 1930, page 70.

Friction-Driven Countershaft

The method of expanding the friction shoes, which have self-equalizing action to take care

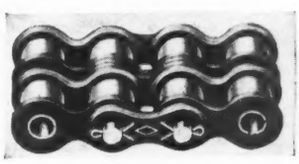


of wear, is a feature of this coupling. The expansion units are made up of right- and left-hand studs, which screw into the hub of a spur gear. When a rack, mounted in a slot in the shaft, is moved either to the right or to the left the spur gear revolves and forces the threaded members outward. This causes a positive contact of the shoes upon the friction surface inside the face of the pulley. Provision is made for considerable wear on the contact shoes before replacement of the lining becomes necessary.

Duro-Friction Clutch Company, Grand Rapids, Mich. Oct. 8, page 573.

2½-in.-Pitch Roller Chain

Made especially for heavy-duty applications, such as on large conveyors, industrial locomotives, and similar equipment, this 2½-in.-pitch chain is similar



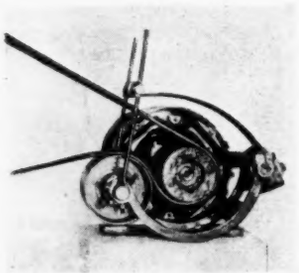
in design to the standard Diamond line.

For single-strand chain, the average tensile strength is 95,000 lb.; maximum horsepower, 97 with 19 tooth sprocket; and maximum r.p.m. 240. It is made in single and multiple strands, transmission capacity and tensile strength being proportional to the number of strands.

Diamond Chain & Manufacturing Company, Indianapolis, Ind. Dec. 10, page 942.

Short-Center Slack-Belt Drives

The device shown is especially suitable for use with a drive where the slack belt must necessarily be on the bottom. In this case the pulley is supported by two curved arms mounted on a hinge bar that is attached to the motor stator. A cantilever spring mounted on

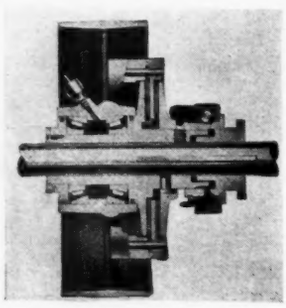


the same hinge bar produces tension on the belt, the free end of the spring being connected with the pulley shaft through two rods. Tension adjustment is made by two nuts on the cross-bar at the free end of the cantilever spring. A similar device is made for use where the slack belt is on top.

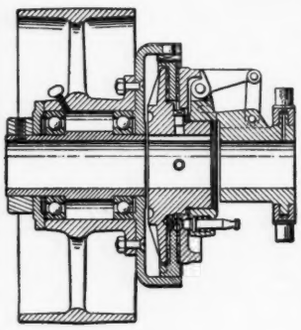
Harry M. Perry, 638 North Main St., Los Angeles, Calif. July 9, page 63.

Clutch With Asbestos-Metallic Liners

Improved design, embodying anti-friction bearings, disk-type clutch, and having better balance, make this clutch suitable for operation at high speeds. It has renewable asbestos-metallic liners of large friction area, a hardened steel cam and rollers and means for effecting a quick release without dragging. A single operating adjustment consists of pressing down on the locking lever and turning the adjuster until the lever snaps into the next slot.



Edgemont Machine Company, 2200 Home Ave., Dayton, Ohio. Sept. 24, page 498.

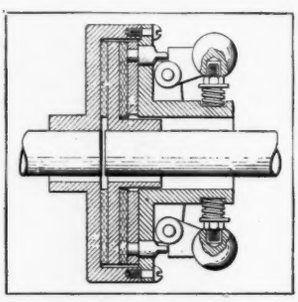


Twin-Disk Clutch With Pulley

In this twin-disk clutch with ball bearing pulley the clutch and pulley are mounted on the shaft as a unit, with the clutch body keyed to the shaft and the pulley free to turn on the ball bearing when the clutch is not engaged.

Adjustments of friction are made by screwing the toggle collar inward. This collar is held in place by a large pin, which, when it is withdrawn and the collar is rotated, snaps into one of twelve holes in the loose plate.

Chicago Pulley & Shafting Company, 17-23 Desplaines St., Chicago, Ill. Nov. 5, page 733.



Accelerating-Type Clutch

An accelerating type of clutch designed for installation between a motor and a driven machine to reduce the starting torque and permit starting with a uniform acceleration is illustrated. Automatic in action and requiring no lubrication, it may be mounted as a coupling between the motor and the machine or may be driven by a belt or chain from the motor. It will operate in either a horizontal or a vertical position.

Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass. March 5, page 405.

Meters, Recorders and Measuring Devices

A complete line of Selsyn-operated instruments for remote indication and record of practically any factor, new flow meter for 5,000 lb. pressure, meter for heat loss through surfaces, and a smoke density recorder represent recent contributions.

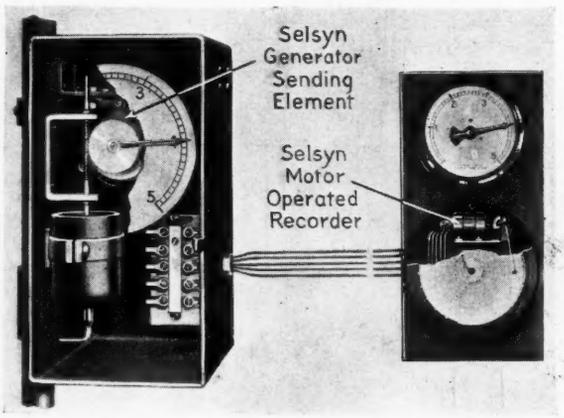
Selsyn-Operated Devices for Remote Indication and Record

The Selsyn principle of transferring indication and measurements is embodied in this line of instruments for remote indication and record of liquid level, pressure, temperature and other factors. The line includes instruments or devices for practically every important application in hydro-electric systems, central stations, waterworks and industrial plants. Several different types of transmitters are used. These consist of pressure, temperature, draft or other actuating elements used to drive the rotor in the Selsyn generator and gear train or other mechanism designed to connect that element with the rotor.

In one type a large hollow float rests on the surface of the liquid whose level is to be indicated, and is connected by a counter-weighted cable and gear train to the generator. A second design employs a steel float resting on the surface of mercury in the open leg of a mercury U-tube so arranged that the generator rotor is driven through a rack and pinion. For indicating levels in closed tanks or drums under pressure a transmitter in which the actuating mechanism is a straight-walled inverted mercury-sealed bell is used.

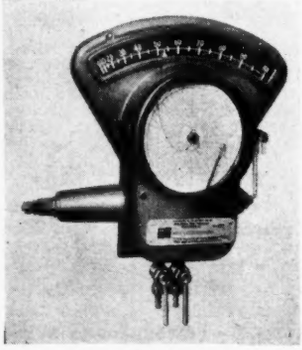
For long-distance transmission of pressure readings the closed leg of a U-tube is connected to the source of pressure, while the other leg terminates in an open reservoir in which a steel float rides on the surface of the mercury. For pressures above 50 lb. an expansive metallic bellows or sylphon connected to the generator rotor by a gear sector and pinion is used as a transmitter. Miscellaneous types are also available for indicating the position of dampers, sluice gates, valves and similar equipment.

Bailey Meter Company, Cleveland, Ohio. Jan. 28, 1930, page 151.



Indicating and Recording Diaphragm Meter

Known as type GK, this meter operates by direct mechanical connection to a diaphragm that is moved by fluid pressure transmitted from an orifice in the main pipe line. Movement



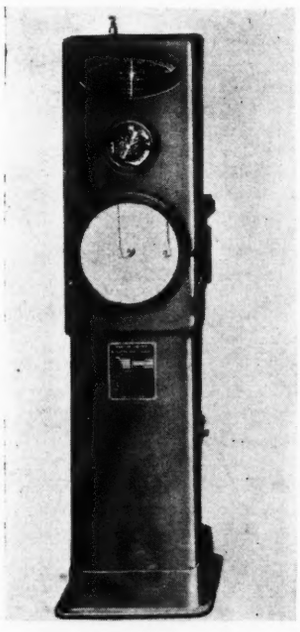
of the diaphragm, which is transmitted through a crank and shaft to an indicator hand, is restrained by two bronze springs, provision being made for changing the tension of one spring from the outside to provide a zero adjustment for the indicator hand. The diaphragm case is of bronze and is outside of and separate from the instrument case. An indicator dial, graduated from 0 to 100 units, shows the rate of flow. The chart is driven by a telechron electric clock motor.

A register, or counter, of the straight-reading type is in the lower part of the case. It is operated by a ratchet and pawl driven from the chart motor, the pawl moving the ratchet a varying amount, depending on the rate of flow.

Builders Iron Foundry, Providence, R. I. Feb. 12, page 284.

Improved Register-Indicator Recorder

The indicating scale at the top of this instrument, which is designed for use with standard Venturi meter tubes, nozzles,

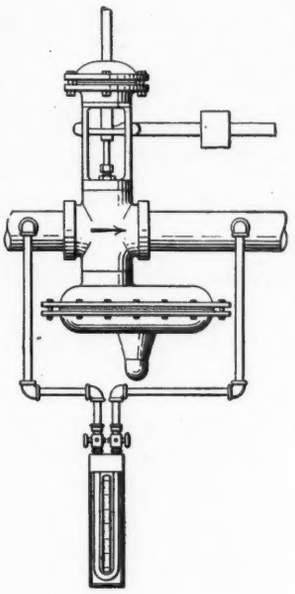


orifices or other primary devices, shows the rate of flow in gallons per minute or per day, cubic feet per second, pounds per hour, etc., as desired. The integrator, or counter dial, is placed directly below the indicator. When used with a Venturi meter tube or nozzle the mercury wells are designed for a maximum differential of 22½ in. of mercury, and when used with an orifice for a maximum differential of either 60 or 120 in. of water (4.76 or 9.55 in. of mercury). For use with orifices a decimally graduated indicator dial and chart is provided. The interior parts of the register are of corrosion-resisting metal.

Builders Iron Foundry, Providence, R. I. Feb. 5, page 244.

Combined Flow Meter and Pressure Indicator

A modification of the regular U-tube manometer, making it suitable for use as either flow



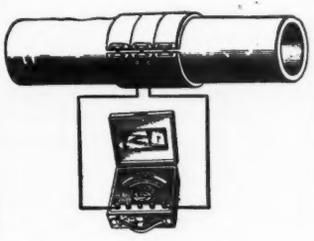
meter or as a pressure indicator, is embodied in this instrument. When used to read pressure of liquids or gases, one of the arms of the manometer is connected to the atmosphere and the other to the source of pressure to be measured. Each inch of difference in level indicates 0.036 lb. per square inch pressure if the liquid used is water, or 0.491 lb. if mercury is used.

To indicate flow of liquids or gases, the two U-arms are connected one on each side of an orifice in the pipe line whose flow is to be measured. An orifice of known size produces a definite drop of pressure for a given rate of flow, the drop being shown on the manometer, which is calibrated to read rate of flow.

Meriam Company of Cleveland, Ohio. Aug. 27, page 349.

Meter for Heat Loss Through Surfaces

Rate of heat flow through a surface in B.t.u. per square foot per hour or other convenient unit is shown directly on a scale without computation by this meter. It consists of an indi-



cating millivoltmeter used with a standard heat conductor made in the form of a thin rubber belt, which is placed in the heat circuit so that the heat to be measured must pass through it.

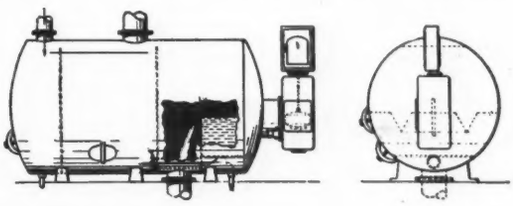
Embedded in the belt, just below the surface, are a number of thermocouple junctions, one set of which is on the outer surface of the belt and the other on the inner. The couples are connected in series and by binding posts on the belt to the indicating instrument.

This instrument can be used not only in measuring heat losses in B.t.u. per square foot per hour, but also to measure the conductivity of insulation.

Weston Electrical Instrument Corporation, Newark, N. J. Jan. 28, 1930, page 153.

Boiler Blowdown Meter

In this combined blowoff tank and meter the blowoff is first received in a compartment at one end which communicates through a perforated baffle with



a larger storage space. From the receiver chamber the water flows to the still-water chamber of the V-notch weir and after passing over the weir is received in an outflow chamber, from which it is drained.

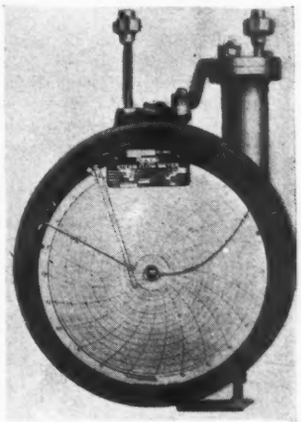
The still-water chamber communicates with an outside recorder float chamber by a high, narrow channel, which tends to insure equality of level between the two chambers. This narrow channel also tends to cause the temperature of the water in the float chamber, through radiation, to be somewhat lower than the temperature of that in the still-water chamber.

Since leakage is usually so slight that it would hardly show up on the chart used to record the regular blowdown, an additional pen and special multiplying mechanism are used to record leakage flow upon a magnified scale.

Cochrane Corporation, Philadelphia, Pa. May 7, page 757.

Steam-Flow Meter

Two mercury chambers connected by a U-leg and the necessary indicating and recording mechanism comprise this velocity-type steam-flow meter. A steel float rides on the surface of the mercury in one of the chambers and transfers the

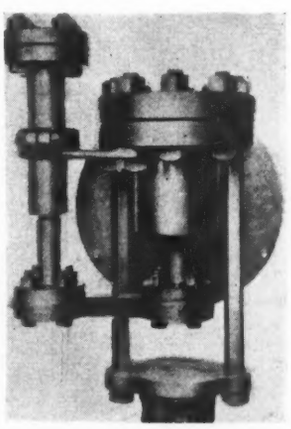


movement of the mercury, with changes in the differential pressure, to the pen arm by a shaft and quadrant. The pen is also connected with an integrator to give totalization of flow, and chart graduations are so arranged that the flow of steam can be read directly from the face of the chart.

Foxboro Company, Foxboro, Mass., May 21, page 838.

High-Pressure Flow Meter

Increasing use of high pressures brought about the development of this flow meter, which is suitable for any working pressure up to 5,000 lb. per square inch and for measuring the flow of gas, air, steam, hot oil and



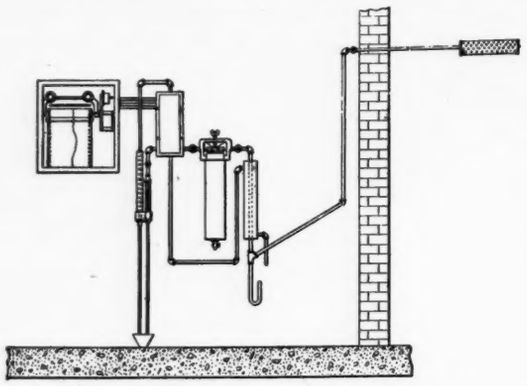
gasoline. All working parts subject to pressure are made from drop forgings.

The meter is calibrated to read and record in terms of flow, and may be equipped with an integrator.

Foxboro Company, Foxboro, Mass. Jan. 14, 1930, page 70.

Improved Method of Installing CO_2 Meters

To eliminate trouble in the operation of electric CO_2 meters due to clogging and gas leaks the method of installation shown



has been developed. A primary filter of perforated metal asbestos cloth projects into the flue or furnace, the pipe supporting the filter sloping downward so moisture is drained off.

The sampling line runs directly down to the U-tube drain, which collects moisture and acid from the sample. The gas then passes through a condenser, where it is cooled to prevent any accumulation of moisture in the analysis cell. A secondary filter, consisting of a container with steel wool and cotton, is placed in the line in front of the cell.

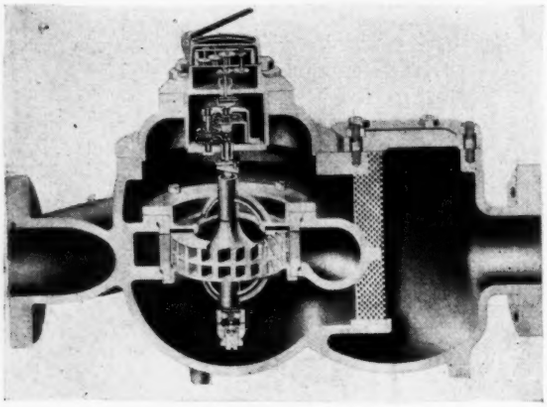
The thermal conductivity cell contains four platinum filaments of comparatively heavy wire mounted in gold-plated cells with gold-lined passages. A 5-wire cable connects the cell with indicating or recording instruments located at any convenient point and calibrated directly in per cent CO_2.

Brown Instrument Company, Philadelphia, Pa. July 2, page 24.

Turbine Cold-Water Meter

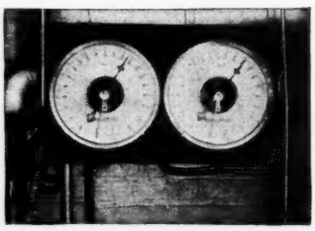
In this improved cold-water turbine meter a hard-rubber-covered turbine wheel is surrounded by a volute pattern chamber which has a sectional area at all parts equal to the volume of the discharge. The wheel is mounted on a bronze shaft fitted with a rubber pivot turning on an agate ball bearing. The meter registers through a three-gear train of Monel metal inclosed so that it may be run in oil. All moving parts are carried in an inner frame, which can be lifted out as a unit by removing the cover. Sizes vary from 10 to 6,400 g.p.m.

Worthing Pump & Machinery Corporation, New York City. Sept. 10, page 420.



Remote-Reading Liquid-Level Gage

The distant-reading tank gage illustrated employs a float mounted on the end of an arm which is pivoted at a fixed point midway between the possible



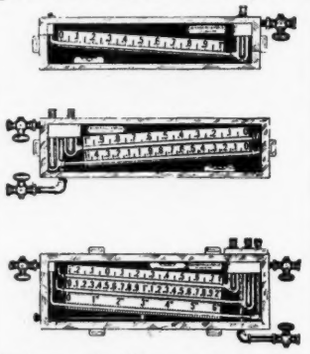
upper and lower levels of the liquid. A linkage connecting with the arm communicates the motion of the float to a balanced hydraulic transmission.

The transmission consists of two pairs of metal bellows, each pair connected by small copper lines filled with a non-compressible liquid. One pair of bellows is located at the tank and the other within the instrument. Any change in the volume of the transmission fluid due to temperature variation is compensated for in the indicator mechanism. Industrial liquidometers are provided in a number of sizes, ranging from a 24-in. dial indicator to an industrial type with a total pointer travel of 10 in. All are adapted for use on tanks which may be either under pressure or under vacuum.

Liquidometer Corporation, Skillman Ave. and Hulst St., Long Island City, N. Y. March 12, page 447.

Multiple-Tube Draft Gages

In these gages each tube is connected to an all-metal one-piece oil chamber fitted with a

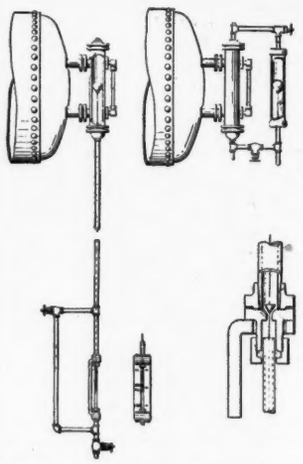


hollow oil-filling and leveling displacement plunger, which facilitates calibration. The single-tube gage is made in a number of draft ranges, from $\frac{3}{4}$ to 3 in., and with scales $7\frac{1}{2}$ or 10 in. in length. It can also be furnished with a compound scale in the 3-in. size. This same gage is also made in the duplex- and triple-tube type. The latter is a combination draft and pressure gage for use with forced-draft underfeed stokers. The top scale, which is 10 in. in length and shows the furnace draft up to 1 in., is made compound. The center scale is graduated for reading uptake draft up to 2 in. Over-all dimensions of the three-tube gage without pet-cocks are: Length 16 in., height $5\frac{1}{2}$ in. and thickness $1\frac{3}{4}$ inches.

Defender Automatic Regulator Company, St. Louis, Mo. July 30, page 188.

Boiler Water-Level Indicator

Placing water-level indicators at any desirable location or elevation for ready observance by the operator is possible with this device. Inside the water column is a non-corrosive float connected by a non-corrosive wire extending downward through a small pipe to an indicator in the water glass. The indicator is so adjusted that when the float in the water column on the



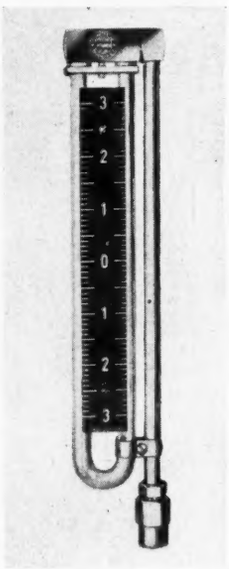
drum is in its normal position, the indicator within the lower glass is also at normal level.

If it is not practical to drop the indicator vertically from the water column on the drum, arrangements are made whereby the water column can be placed inside the drum, or horizontal extensions of any length can be made to bring the water column to any desired position.

Combustion Engineering Corporation, New York City. June 11, page 977.

U-Gage for Static Pressures

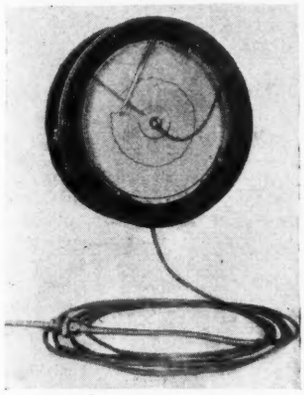
An improved method of packing whereby the U-tube is easily replaced in case of breakage is a feature of this U-gage. The scale, graduated in inches



and tenths of an inch, has a black background with distinct white figures.

A pressure-tight connection between the U-tube and the head piece is made by a cross plate compressing the two packings simultaneously, pressure being exerted by a single screw.

Amthor Testing Instrument Company, Inc., 309 Johnson St., Brooklyn, N. Y. Dec. 31, page 1050.



Recording Thermometer

Designed for temperatures from minus 40 to plus 750 deg. F. this recording thermometer consists of a dust-, fume- and moisture-proof housing which incloses the working parts. The element is comprised of a bulb, capillary tube and Bourdon tube, filled with a special liquid that has an equal coefficient of expansion over the entire scale range of the instrument. The ratio between the pressure of the liquid and the movement of the pen is 1 to 1, so that levers, gears and other small parts are eliminated. A compensating spring takes up any difference between the bulb and room temperature and automatically resets the pen at the point on the chart corresponding with the bulb temperature.

Moto Meter Gauge & Equipment Corporation of Long Island City, N. Y. Jan. 21, 1930, page 116.

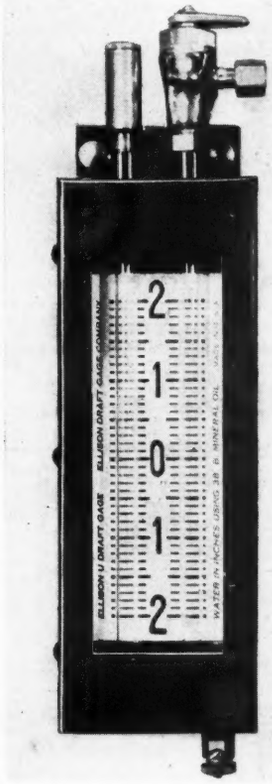
Level Gage With Turned Fittings

All metal parts of this level gage are turned out of solid brass stock. The diameter of the glass is $\frac{5}{8}$ in., and valve shanks are $\frac{3}{8}$- or $\frac{1}{2}$-in. pipe thread. It is available in lengths from a few inches to 36 in. center to center of fittings. It is used as standard equipment on all filters and tanks put out by the company.

Wm. W. Nugent & Co., Inc., Chicago, Ill. April 30, page 717.

Cover-Type U-Gage

Available in the convenient ranges of 4, 6, 8, 12 and 16 in. of water, using red oil; and 5, 8, 10, 15 and 20 in. of mercury, or pounds per square inch, using mercury, this covered U-draft gage has a wide application for



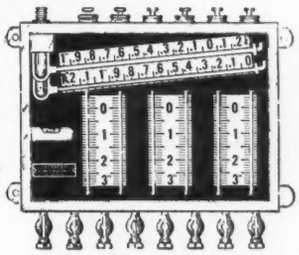
direct reading of air and gas pressures minus, plus or differential. The U-tube is inclosed in a dustproof case and is provided with fittings and sliding scale for zero adjustment.

Colored oil is the indicating liquid. Calibration reads directly in inches and tenths of inches of water when using mineral oil, and with mercury in inches and tenths of inches of mercury or pounds and tenths of a pound per square inch.

Ellison Draft Gage Company, Chicago, Ill. Dec. 3, page 899.

Draft Gage With Oil-Leveling Plunger

An all-metal one-piece oil chamber fitted with a hollow oil-filling and leveling displacement plunger is a feature of this combination draft and pressure gage. The leveling attachment



consists of a plunger made adjustable vertically in an oil chamber to provide a ready means of leveling the oil in the tube or bringing it to zero on the scale. The upper part of the plunger is drilled to provide an opening for replenishing the oil supply.

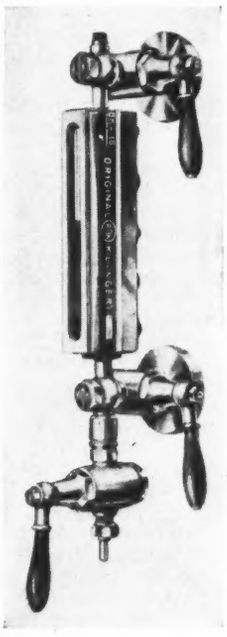
The gage is made with from four to eight pressure tubes in the one case, and is furnished with 3- or 7-in. vertical scales. The two inclined tubes at the top are for indicating the draft over the fire and in the last pass of the boiler. All tubes have bottom connections through $\frac{1}{4}$-in. pot-cocks. Dimensions of the gage are: 12 in. high and 14 in. wide.

Defender Automatic Regulator Company, 308 South 8th St., St. Louis, Mo. July 9, page 63.

Improved Reflex Water Gage

In this improved reflex water gage a single row of back screws replaces the double row (one on each side) formerly used. This construction precludes the possibility of straining the gage body or breaking the glass through uneven screw adjustment.

Another feature is the use of gage cocks fitted with interchangeable elastic packing sleeves on which no stuffing boxes are used. The main body

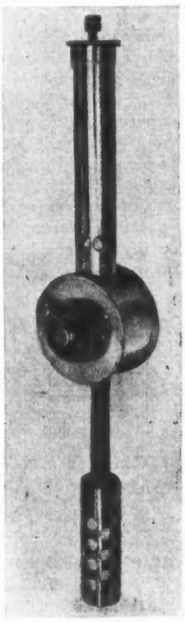


is made with straight ends for fitting into ordinary gage cocks in place of glass tubes. Water in the gage appears black, the steam silver, contrast making the water level easily readable from a considerable distance. Gages of this type are obtainable for pressures up to 1,500 pounds.

Klingerit, Inc., 16-22 Hudson St., New York City. Feb. 26, page 363.

Gas Leak Detector

Consisting of a porous clay cylinder connected with a diaphragm by a small tube; and a small incandescent lamp, which serves as the indicator, this gas leak detector when plunged into an atmosphere of gas of a density different from air will in-



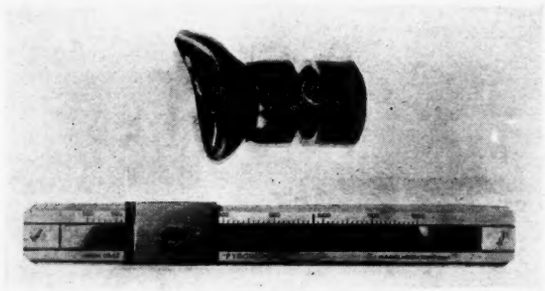
dicate the presence of the gas whether it be lighter or heavier than air. The diaphragm, by its position, which changes with the density of the gas, makes or breaks the lamp circuit.

When it is desired to test for a light gas the instrument is adjusted so that a slight movement of the diaphragm will make the circuit; and for a heavy gas the adjustment is made so that a slight movement will break the circuit. Current for the lamp is supplied from a flashlight battery, which, with the lamp, is inclosed in the handle of the instrument. A second contact screw is provided at the end of the handle to break the circuit when the instrument is not in use.

Colonial Supply Company, 217 Water Street, Pittsburgh, Pa. Nov. 12, page 769.

Optical Pyrometer

Pyroversum is the name given to this optical pyrometer, which is suitable for reading the temperatures of boiler furnaces and



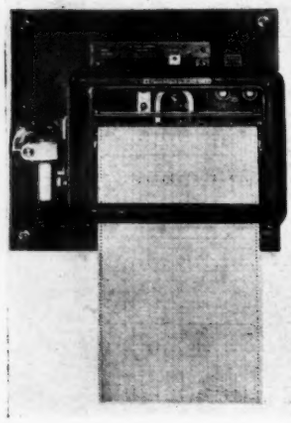
for various uses in metallurgical and similar operations. It consists of a frame 8½ in. long x 1 in. wide which carries a special shaded glass. One end of the glass is clear, being gradually darkened throughout its length until at the other end it is practically opaque. On one side of the frame is a scale 5½ in. long, registering from 550 to 1,200 deg. C., or it may be calibrated for Fahrenheit readings (500 to 2,500 deg.). On the frame is mounted a slide having a circular hole in the center through which the hot body may be seen through the shaded glass. The slide is moved along the frame until the glow can no longer be seen. The temperature may then be read on the scale.

Mace Template & Engineering Company, Ltd., 19 Cursitor St., London, E. C. 4, and Charles Mitchell, 311-323 West 23d St., New York City. Sept. 24, page 498.

Recording Pyrometer Has Wide Chart and Open-Record Scale

Important features of this pyrometer are an unusually wide chart with an open record scale and a simplified mechanical movement. The chart is 12 in. wide over-all, with 11 in. of calibrated scale.

A choice of three chart speeds, namely ¾ in. per hour, 1½ in. per hour and 3 in. per hour, permits the user to secure the speed most suitable to his needs. Changes in the temperature of the thermocouple cold junction are automatically compensated for in the instrument by an electric cold-junction compensator. An external drive is arranged so that a group of recorders, or a group combining this recorder and an automatic temperature control pyrometer, can be operated as a unit.

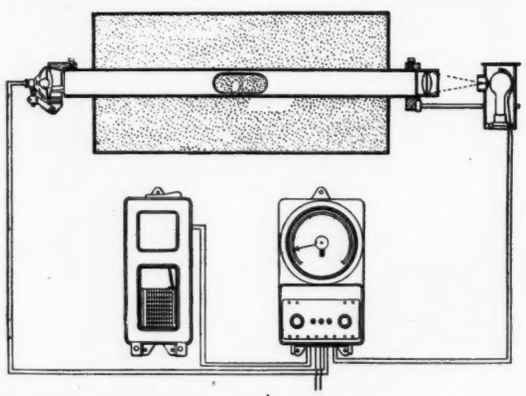


Charts are available for a wide selection of scale ranges, in both Fahrenheit and Centigrade, to suit the various types of thermocouples and the various temperatures of industrial operation.

Wilson Maeulen Company, Inc., 383 Concord Ave., New York. Nov. 5, page 731.

Smoke Density Meter

This smoke-density meter is based on the principle of the measurement of density or opacity of any medium to transmitted light, and the readings are interpreted in terms of percentage density, 100 per cent density being total opacity to light and 0 per cent density being clear or offering no reduction in the intensity of light.



The meter consists of two principal parts, an optical system, which is an apparatus for transmitting a beam of light through a portion of the smoke or gas to be measured, and a light-sensitive device to receive the beam of light after transmission; and a meter for indicating or recording the density, together with the current supply and control equipment.

The optical system, of which there are two forms, types A and B, is mounted on a length of standard 3-in. pipe. In type A the pipe is passed through openings cut through opposite sides of the flue or stack, the ends of the photo-electric cell and light projector being mounted on the ends of the pipe.

Type B optical system is used where it is difficult to pass the orifice pipe through the gas stream.

Both types of systems are identical, with the exception of the pipe, and consist of a lamp fitted with a silvered parabolic reflector arranged to give a parallel beam of light across the smoke orifice onto a lens which concentrates the light onto the sensitive surface of the photo-electric cell. The recorder is a strip chart. A portable meter can also be furnished for use by engineers in making boiler tests.

Frank Sawford, 610 Credit Foncier Building, Vancouver, B. C., Canada. April 23, page 679.

Pyrometer Records up to 1,200 Deg.

This instrument consists of a D'Arsonval-type millivoltmeter connected by suitable leads to a thermocouple mounted in a special casing. It is calibrated to read temperatures from 0 to 1,200 deg. F., in 20-deg. divisions. It is automatically compensated for changes in temperature and cold end differences by a thermostatically operated magnetic shunt on the instrument magnet. A section of armored tubing is built into the couple, protecting the instrument leads up to the point where they are attached to the terminals.

Roller-Smith Company, 233 Broadway, New York. July 16, page 105.

Indicator for Combustible Gases

Ability to detect the presence of a wide range of combustible gases or vapors and whether the atmosphere containing these gases is safe to breathe and safe for flames of fire is claimed for this instrument. The device is a modification of the methane indicating detector made by the same company. It utilizes the effect of combustion of flammable gas and air mixtures on the surface of a heated filament. Combustion increases the temperature and, consequently, the electrical resistance of the filament. Change in resistance causes the needle of a meter to move over a scale.

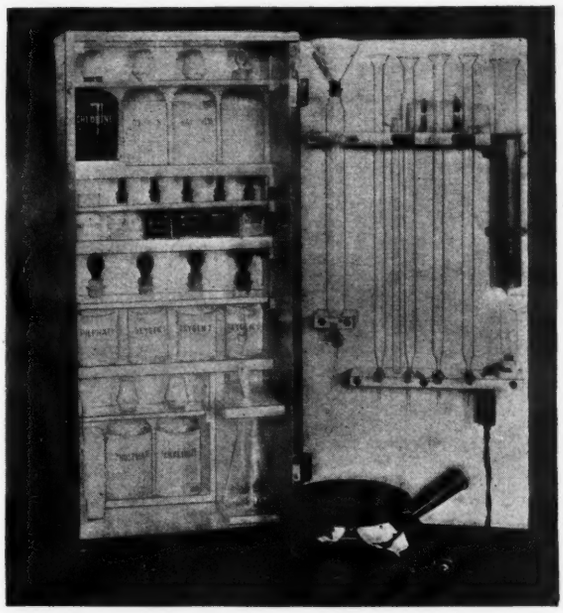
With this instrument sampling and laboratory analyses are eliminated; indications are immediate; continuous observations may be made while men are working in gaseous atmospheres; all accessible parts of tanks or compartments can be thoroughly tested for gas pockets; the detector head may be lowered into a tank while the operator remains outside; the entire outfit is safe to operate in all gas-air mixtures except those containing acetylene or hydrogen.

Union Carbide Company, 30 E. 42d St., New York City. Feb. 26, page 363.

Portable Laboratory for Testing Feed Water

Designated the "Lab-Rette," this small portable laboratory for testing feed water is complete in itself and makes possible the determination of hardness, chlorides, sodium phosphate, alkalinity, pH value, sodium sulphate, dissolved oxygen and total dissolved solids.

Hardness and chlorides are determined in the usual manner. Sodium phosphate is determined by a special method based upon the difference in action of mono-, di-, and tri-sodium phosphate to phenolphthalein and methyl orange. Hydrogen-ion concentration is determined by colorimetric means. Sodium

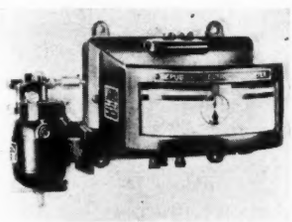


sulphate is ascertained by a specially constructed sulphate meter which makes use of the turbidity of a barium sulphate precipitate. Dissolved oxygen is determined by an improved Winkler method wherein the results are given directly in oxygen content. The total solids are approximated by the addition of certain of the foregoing factors.

Babcock & Wilcox Company, 85 Liberty St., New York City. April 9, page 600.

Pyrometer With Motor-Driven Depressor Switch

A new combination of pyrometer control apparatus and mercury switch designed specifically for the control of any type of fuel-burning furnace is illus-



trated. It may be applied to other control applications, to draft, pressure, etc.

In this instrument the usual open metallic contacts and relays that previously have been required for controlling electrical loads of any magnitude have been eliminated. A gas-filled mercury switch will handle currents up to 25 amp. at 220 volts. Above 10 amp. the switch uses a mercury-to-mercury contact and the make and break occurs inside of a quartz tube, which is insulated from the glass sealing tube.

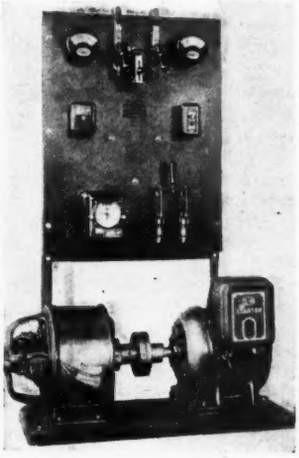
The pyrometer is of the standard high-resistance, double-pivoted millivoltmeter system. It has automatic cold-junction compensation and is available with various scales up to 3,000 deg. F., depending upon the temperature range. It may be used with either noble or base-metal couples.

Republic Flow Meters Company, 2240 Diversey Parkway, Chicago, Ill. Aug. 13, page 262.

Miscellaneous Machines and Tools

Industrial Battery Charger

This industrial battery charger complete with control board, can be furnished with either direct or alternating-current motor, to suit the conditions of the installation, and with switchboard to suit the type and number of batteries. It can be furnished for charging either one or more lead or Edison bat-

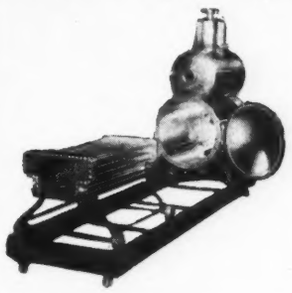


teries either manually or automatically. The motor-generator is a four-bearing unit, fitted with anti-fraction bearings and a flexible coupling between the machines.

Engberg's Electric & Mechanical Works, St. Joseph, Mich. Aug. 13, page 264.

Removable Tube Bundle Evaporator

An important feature of this evaporator is the ease with which the tube bundle may be withdrawn and cleaned. The unit consists of a removable tube body, evaporator body or boiling chamber, a vapor chamber



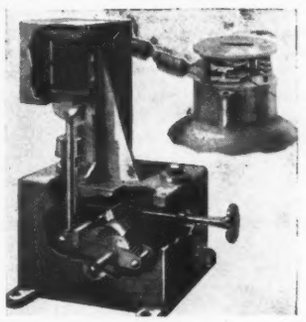
placed above the evaporator body and a catch-all at the top of the vapor chamber. The tube bundle is mounted on rollers, on which it may be run from tracks to a carriage on a track in front of the evaporator. The machine is available in various sizes and in metals for any type of service.

Oakland Copper & Brass Works Oakland, Calif. Aug. 6, page 222.

Electro-Magnetic Chemical Proportioner

This magnetic proportioner is mounted on top of the chemical tank, and the amount of water supplied to the softener controls the volume of chemicals introduced, so that a fixed ratio is maintained and therefore a known reaction is obtained. All water fed to the softener is measured by a standard water meter, as shown. By an attachment to the recording mechanism of the meter quick makes and breaks are made in an electric circuit. These impulses are, in turn, translated into mechanical motion to regulate the chemical feed through a solenoid-operated feeding device.

The solenoid is located in a sealed bronze box, and all the working parts of the proportioner are incased in a bronze housing filled with oil. Outstanding advantages of the unit are its small size, and its location on top of the chemical tank, which permits floor-level operation regardless of the size or type of the softener. Where a number of chemicals are to be fed separately, the same number of these proportioner units can be operated from one meter.

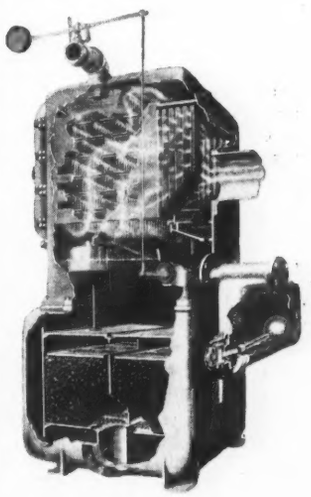


Paige-Jones Chemical Co., Inc., Hammond, Ind. Aug. 6, page 221.

Improved Open-Type Feed-Water Heater

Important features of this open feed-water heater, which is being built in capacities up to 70,000 lb. of water per hour, include a combined ribbed and multiple baffle oil separator, new type of tray designed to break up the water into a finely divided state, and a two-way filter for removal of precipitates.

Upon entering the heater the exhaust steam, after dividing and passing through an oil separator, passes down two side



steam aisles to the bottom of the tray nest before it enters the heater proper. Heater trays are especially designed to divide the water into minute drops so as to expose a maximum total heat-absorbing surface to the steam. The curvatures are so proportioned that water leaves the down-turned serrated edge of the pans in a finely divided state. Trays have been designed

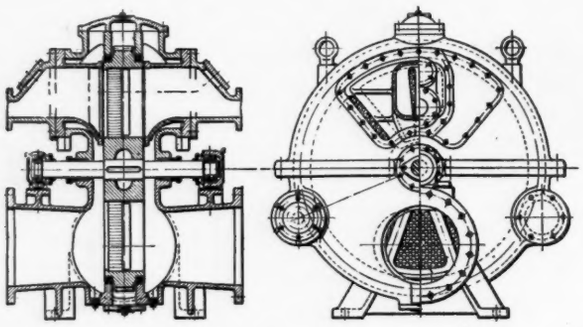
with a view to overcoming trouble usually encountered from deposits of scale changing the water distribution within the heater.

An overflow trap of the float-controlled type permits use of the heater under either atmospheric or back-pressure exhaust service. A deaerating type, N-D, embodying the same general design, is also included in this line.

Worthington Pump & Machinery Corporation, Harrison, N. J. May 21, page 837.

Rotary Strainer With Continuous Cleaning

This rotary strainer unit consists, essentially, of a stationary casing and a rotating strainer wheel having teeth on its periphery which engage with a driving pinion, the pinion in turn being driven by a motor through a reduction gear or V-belt. The inlet side of the strainer wheel has a series of spokes or webs to hold the leaves, grass and other foreign matter and carry it, as the wheel rotates, to the top of the casing, where it is washed free by a cleaning-water jet and discharged through a refuse pipe.



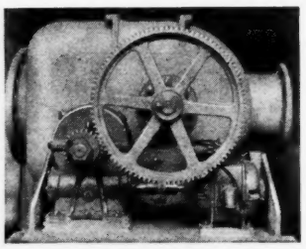
Four different driving positions are possible, as the wheel casing has a pinion housing on each side and the pinion is reversible and may be driven from either side.

Made in six sizes or frames, Nos. 1 to 6, inclusive, units are available in capacities from 4,000 to 70,000 g.p.m. and with pipe connections from 14 to 60 in. in diameter.

Andale Company, 1600 Arch St., Philadelphia, Pa. Jan. 14, 1930, page 69.

Strainer With Motor Drive on Screen Cleaner

In the Holt strainer a heavy perforated copper cylinder, having open ends, is interposed between the inlet and outlet, the foreign matter being retained on the inner surface of the cylinder. This surface is cleaned at intervals by rotating a shaft to which is affixed a spiral scraper, which sweeps the surface of the perforated cylinder, and discharges the refuse through a valve into a sediment chamber, from where it can be removed without interfering with the flow through the strainer. A strainer equipped with a motor drive on the cleaning mechanism is now available. This makes the larger-size strainer particularly adaptable to bad water conditions, where the cleaning must be done frequently, and to installations where the strainer must necessarily be placed in a rather remote location. A drive can be furnished on all strainers 8 in. and larger.

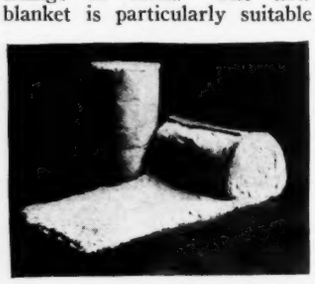


Rosedale Foundry & Machine Company, Pittsburgh, Pa. Oct. 15, page 610.

Rock Wool Blanket

Made in three thicknesses—1 in., 1½ and 2 in.— and in standard widths of 24 and 36 in., the rock wool blanket illustrated is made in a continuous bat, and can be rolled out and cut with an ordinary large straight-blade knife.

The rock wool is made from pure limestone rock. It is fireproof and will withstand temperatures of 2,000 deg. without change in form. The new blanket is particularly suitable for the making of fabricated blankets in which the rock wool is put between wire netting or metal lath.



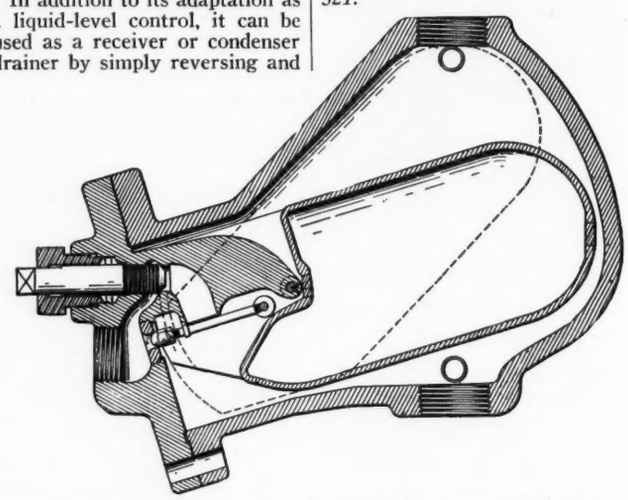
Union Fibre Sales Company, Winona, Minn. Dec. 10, page 941.

Ammonia Float Control and Receiver Drainer

To eliminate the danger of ammonia slugs passing over to the condenser, and to permit all the evaporating surface to be used, this ammonia float control has been developed. It is small in size and light in weight in relation to its capacity. It can be placed directly in the pipe line without further support.

The control consists of a cast-iron body with flanged cover, a counter-balanced cast-iron float and valve mechanism. The float is hinged and the hollow end is counter-balanced, leaving the float's buoyancy to operate the valve. The valve spindle is attached to the float at a point close to the fulcrum, but with sufficient offset to give maximum valve opening with normal travel to the float. A removable ball disk and seat of high-carbon chrome steel are interchangeable for the various sizes, according to the service for which the valve is used.

In addition to its adaptation as a liquid-level control, it can be used as a receiver or condenser drainer by simply reversing and connecting at the proper point. The valve is made in three sizes, of 2, 12 and 125 tons' capacity.



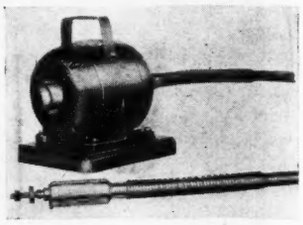
D. K. Warner, Bristol, Conn. Jan. 7, 1930, page 37.

High-Permeability Iron

This material is a Swedish charcoal, Lancashire iron product adapted for core parts where high permeability and low hysteresis loss are essential. The iron is wrought or puddled and possesses altogether different properties from ingot metal.

It is obtainable in cold-drawn rounds, squares, flats, special shapes, and in cold-rolled, dead-soft annealed strips. Sizes for rounds and squares vary from 1/64 to 3 in., and for cold-rolled strips, from 0.410 x 3 in. wide to 0.250 x 6 in. wide.

A. Milne & Company, 745 Washington St., New York. Dec. 3, page 900.



Flexible Shaft Unit

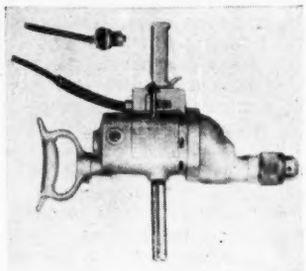
Three types of mountings are provided for this flexible shaft grinder. They are: Pedestal mounting, trolley mounting for overhead monorail service, and a portable type bolted to a plate. The flexible shaft is driven by a ½-hp. motor suitable for operation on 110- or 220-volt, 60-cycle circuits. Motor speed is 1,750 r.p.m., but it can be furnished for operation at 3,500 r.p.m. The length of the flexible shaft is 6 ft., and it may be used to drive grinding wheels, buffing wheels for cleaning condenser tubes and a number of other services.

Peerless Electric Company, Warren, Ohio. Feb. 19, page 321.

All-Purpose Electric Drill

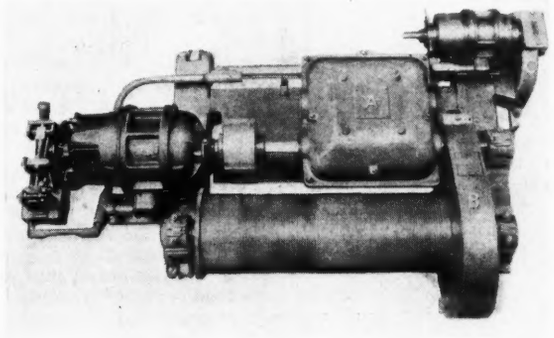
A portable electric drill suitable for general drilling and for use with a bench stand is shown. Anti-friction bearings are used, with the heavy thrust loads carried by roller bearings. Speed reduction between the motor and the drill is through hardened gears. The drill has a capacity up to ⅝ in. in steel and up to 2 in. in wood.

Wodack Electric Tool Corporation, 4627 West Huron St. Chicago, Ill. Sept. 17, page 458.



Improved Crane Trolley

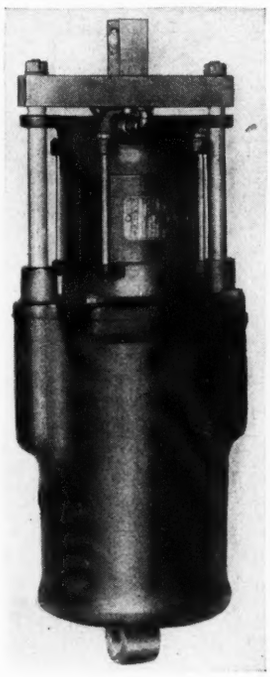
In this crane trolley, the high-speed reduction gear between the hoisting motor and cable drum, as well as the load brake and principal bearings, are inclosed in a dust- and moisture-proof casing. The final, or slow-speed, reduction to the cable drum and the reduction gear drive from the trolley motor are protected with covers, small removable plates on the casings facilitating inspection. This construction assures all gears being adequately protected from dirt and the high-speed gears and load brake being maintained in proper alignment.



Shephard Niles Crane & Hoist Corporation, Montour Falls, N. Y. June 11, page 979.

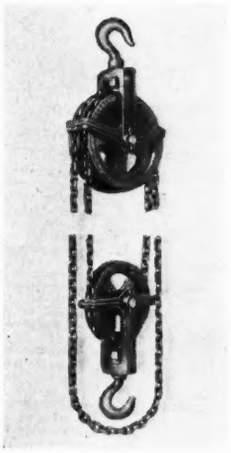
Hydraulic Operator

Designed to take the place of large alternating-current or direct-current magnets and solenoids, this hydraulic operator may also be used to replace air cylinders where quiet and smooth upward thrust is desired through a given distance. A motor-driven centrifugal oil pump the impeller of which is mounted in a piston and driven by means of a spline shaft creates a pressure between the bottom of the piston and the bottom of the cylinder, forcing the piston upward when the motor is energized.



Rated on the stalled-thrust basis the three standard sizes of operators give 200, 300 and 600 lb. push. Speed of operation is somewhat slower than that of a solenoid, but is relatively fast. The motors used are ¼ to ½ horsepower.

General Electric Co., Schenectady, N. Y. Oct. 8, page 572.



Differential Chain Hoist

Features of this differential chain hoist are anti-friction thrust bearings on the lower hook to permit easy turning of the load; sheaves of an alloyed iron of high strength and unusual hardness; and aluminum finish throughout except on the chain. The chain is a special-analysis steel, heat-treated and electrically welded. The hooks are of forged steel, heat-treated, and they swivel freely.

The hoist is manufactured in five sizes, in capacities from ¼ to 2 tons, inclusive. Regular lifts range from 6 ft. for the ¼-ton size to 9 ft. for the 2-ton size.

Robbins & Myers, Inc., Springfield, Ohio. Dec. 10, page 942.

Weatherproofing and Acid-Resisting Coating

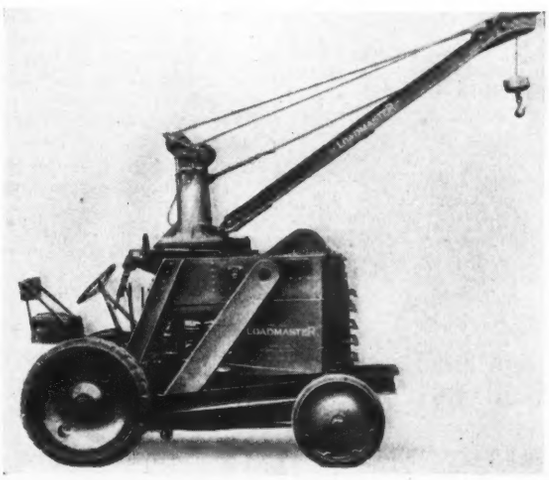
This protective covering of a weatherproofing and rustproofing nature for practically any surface, known as "Oapalite," is said to be free from acids, coal tars or bisulphide products and may be applied with a brush or spray gun, drying in 6 to 24 hr. and forming a film that will neither crack, peel nor blister, nor soften under 400-deg. temperature.

Among other applications, it is suggested for use on the surface of boilers, concrete walls and machinery, and practically any surface of metal, wood, leather, paper or cloth. It is also claimed to be a good electrical insulator of high dielectric qualities. It is available in three colors, black, mahogany red and olive green, in containers ranging in size from 1-gal. cans to 55-gal. steel drums.

Merritt Products Company, 1604 Wright St., Chicago, Ill. June 18, page 1017.

Tractor-Mounted Swing Crane

Designed to meet the need for a small locomotive crane of general utility, this crane combines mobility and power for lifting and swinging loads in crane service, with tractive power for haulage. The crane structure is superimposed directly upon the tractor, giving a unit mounting for the engine, crane mechanism, mast and boom. The bull wheel for swinging the boom is power-driven and is equipped with a brake, so that the boom may be set at any angle over the side or front of the tractor.

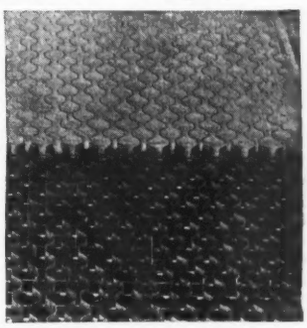


The hoisting drum is directly connected to the self-locking worm gear, which, when the drum is not in motion, holds the load in suspension without the use of an added friction brake on the hoist line. Hoisting speed of the load may be varied up to a maximum of 38 ft. per minute. All controls are grouped at the rear, within easy reach of the operator. The capacity of the unit is 3,000 lb., and the total weight 11,000 pounds.

Frederic H. Poor, Inc., 50 Church St., New York City. Nov. 19, page 806.

Steel Armoring for Concrete Floors

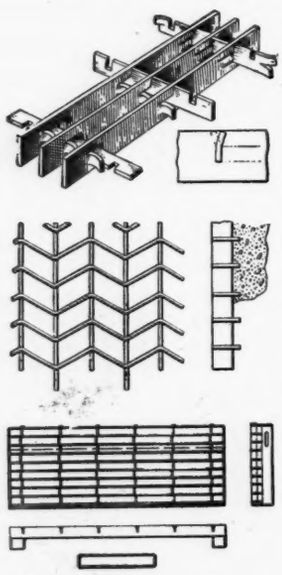
This steel armoring material, known as "Floorgard," is a built-up continuous steel mat that is laid down to form the surface of the floor. Design is such that stresses are taken care of by the steel itself and the loads distributed throughout a wide area of floor. Strips which constitute the mat are set on edge, and small short circular tie rods are inserted in a horizontal position through holes in the middle of the strips. The tie roads act as carrying members, tying one strip to another, as well as tying the entire surface into one steel mat. It can easily be cut in the field to fit around machine bases, columns or other obstructions. The armoring is made in various sizes of mesh to conform to local conditions, such as weights of loads, types of traffic, etc.



Blaw-Knox Company, Pittsburgh, Pa. March 5, page 404.

Floor Grating Mechanically Locked

Rigidity is secured in this grating by the use of mechanically locked joints. The crossbars



are slotted half way down from their top edge to permit them to straddle the upper portions of the main bars after they have been turned up into their permanent position. Alternating the direction of bending the crossbars throughout the construction creates a truss effect that materially increases the rigidity of the floor.

To provide suitable areas of trucking surface, the grating is turned upside down, every other main bar is left out and the grating given a zigzag effect. As the crossbars are below the surface, there is a continuous run of concrete between the two main bars. Stair treads are made up of the standard floor grating with a special support at each end welded on in a loop form.

Walter Bates Steel Corporation, Gary, Ind. April 23, page 681.

Coagulant Reduces Residual Alkalinity

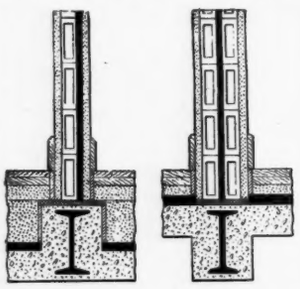
Ferric Alumina is the name given to a material or coagulant prepared especially to insure the rapid settling out of the precipitate in the lime-soda process of water softening. It is made up of a colloidal sol of hydrous alumina peptized by ferric chloride. The resulting product is essentially a protective colloid and, like others of its class, breaks down when depeptized to form a combined floc of hydrous aluminum and hydrous ferric oxides. The weight of the iron floc plus the high absorption powers of the aluminum floc is thus obtained in one material. Such a combination tends to give complete coagulation and quick precipitation, while the loosely bound chemical combination allows of almost instantaneous reaction without the use of excess reagents. Ferric Alumina has definite acid reaction, as a result of which it reduces the residual alkalinity while performing its function of coagulation.

Paige & Jones Chemical Company, Inc., Hammond, Ind. Oct. 8, page 572.

Wall and Floor Soundproofing Material

To restrict and overcome the transmission of sound waves through a partition wall or floor two types of material — "Absorbit" for wall insulation and "Absorbo-Phone" for floor insulation—have been developed.

Absorbit is made of layers of fibrous material with an air spacer and is impregnated with asphaltum. The layers are laminated together to $\frac{3}{4}$ in. thickness and are made in standard plate



size 24x48 in. They are readily cut to any desired shape.

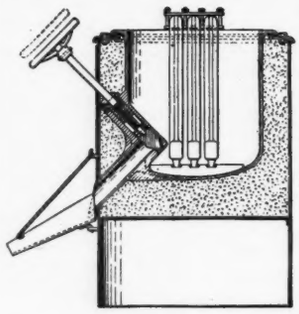
In the floor insulation material, strips of natural cork $\frac{3}{4}$ in. thick are fastened lengthwise and crosswise to the floor slab with mastic. Specially prepared finely ground cork is distributed into these spaces. The cork strips are then given a coating of asphaltum, and a layer of asphalt felt is spread, the edges of the felt being overlapped and sealed. This gives a non-porous layer of low density, upon which any kind of finished floor can be laid.

Korfund Company, 235 East 42d Street, New York City. June 4, page 941.

New Steel for Boiler Plates

"Izett" is the name given to a new boiler steel now being manufactured in this country under license from Fried. Krupp A.A., Essen, Germany. The outstanding properties of this steel are the fact that it does not become brittle when cold-worked, retains its toughness under all conditions encountered in boiler practice, and is non-aging.

Central Alloy Steel Corporation, Massillon, Ohio. Oct. 1, page 533.



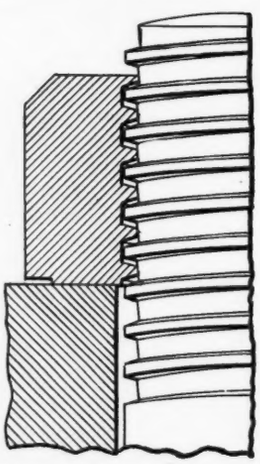
Electric Melting Pot

The bottom pouring feature of this electric metal-pouring pot is particularly applicable in cases where it is impracticable to ladle and where large quantities of metal are handled. It is designed for melting babbitt, lead, tin, solder, and similar metals, except spelter or zinc, at temperatures not exceeding 950 deg. F. Heat is generated directly in the metal, affording quick heating and low radiation loss, and the heating units are easily replaceable. The control consists of an automatic control panel and a temperature instrument. Manual regulation is not recommended.

General Electric Company, Schenectady, N. Y. June 4, page 941.

Self-Locking Bolt and Nut

In this form of screw-thread, known as the "Threadlock," a



locking action takes place between the bolt and nut and eliminates the necessity of locknuts, lock washers and cotter pins. The thread angle approximates that of the Acme, with the difference that space between the threads is considerably wider than the thread and the bottom of the thread is at an angle with its axis. When the nut seats on the work, the conical surfaces are forced into contact. This puts the nut under stress and locks it to the bolt by friction of the inclined surfaces. Locking action so produced is effective at any point along the threaded length of the bolt. The nut can be readily released with a wrench and can be used repeatedly.

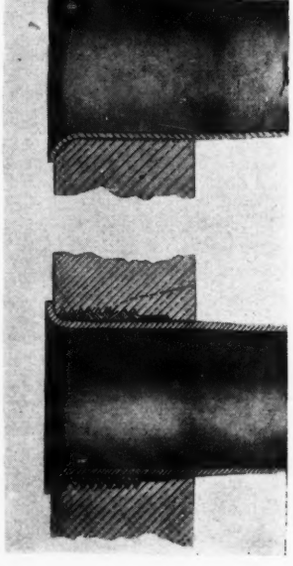
Dardelet Threadlock Corporation, 120 Broadway, New York City. March 19, page 481.

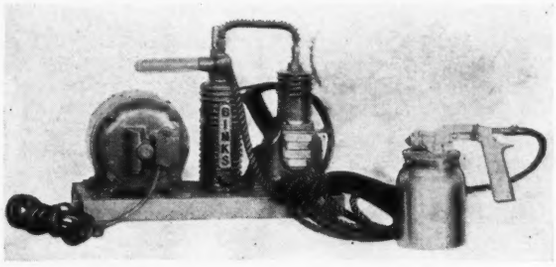
Improved Method of Installing Condenser Tubes

The method of installing condenser tubes illustrated removes the necessity for overexpanding and gives increased holding power, as well as eliminating creep of the tube in the sheet. A special tap is first put through the hole in the sheet to give a series of grooves 0.005 in. deep (about 40 per inch), into which the tube is forced by expanding. After expanding, the end of the tube projecting beyond the tube sheet is belled over. Expanding is done with a tool having long rolls and tapered ends, so that the tube is expanded the full thickness of the sheet and has an easy taper to meet the normal internal diameter of the tube.

To adapt this method to existing condensers on which the tube sheets have been drilled and tapped for packing in the usual way (with packing and ferrules) a bushing is first screwed in to fill the space normally occupied by the ferrule. It is then faced off and countersunk with a radius tool, and a special tap is run through to give a grooved surface, as previously described. After it has been rolled in the sheet the tube is flared or bell-mouthed to give a proper hydraulic inlet to the circulating water, then beaded over against the tube sheet.

Scovill Manufacturing Company, Waterbury, Conn. Jan. 14, 1930, page 68.





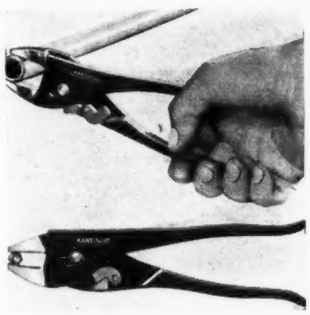
Self-Contained Spray-Painting Outfit

The spray-painting outfit illusted is adaptable to a variety of general utility work, such as touching up or repainting equipment and building walls, where a regular supply of compressed air is not available. The compressor has a capacity of 2.16 cu.ft. of air per minute and is belt-driven by a ½-hp. motor. The spray unit is fitted with a one-quart all-metal container and a pressure-cup spray gun supplying an atomized flat spray 4 in. in width.

Binks Manufacturing Company, 3114 Carroll Ave., Chicago, Ill. Sept. 10, page 421.

Pliers With Sliding Fulcrum

A claim made for these pliers is that there is no strain on the pin, it serving merely to hold



the two members together. When the pliers are applied to the work a cam slides the fulcrum to its correct position irrespective of the duty. This sliding action positively wedges the work between the jaws, making the tool hold round work as readily as irregular shapes. A movable cam is added adjacent to the stationary one to assist in giving a parallel grip on small work.

Kant Slip Plier & Tool Company, 6036 Wentworth Ave., Chicago, Ill. Dec. 31, page 1050.

Corrosion-Resisting Steel

A corrosion-resistant steel intended to withstand the action of hot weak solutions of sulphuric acid is being produced under the name "Durimet." Three varieties are available, listed as A, B, and D, all containing high percentages of nickel and silicon. Grade A contains 25 per cent nickel, 5 per cent silicon, a trace of chromium, and 0.25 per cent carbon. Grade B contains 35 per cent nickel, 5 per cent silicon, 12 per cent chromium, and 0.25 per cent carbon. Grade D contains 15 per cent nickel, 3 per cent silicon, 2.5 per cent chromium and 0.60 per cent carbon. Each grade is available in a number of forms.

Duriron Company, Inc., Dayton, Ohio. Nov. 19, page 808.

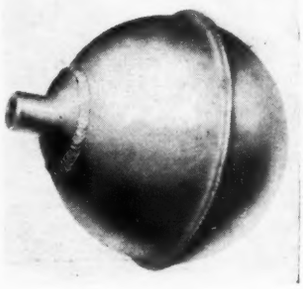
Insulating and Protecting Lacquer for Metal Surfaces

Unusual resistance to acids, alkalies, mineral oils and high temperatures is claimed for this lacquer. It is particularly suitable for sealing joints in gas mains, for painting structural iron, motors, oil tanks and other metal parts requiring insulating paints of high dielectric strength. It is available in five colors, and may be applied by brushing, spraying or dipping. It dries dust free in about 3 min., and to a hard finish in about 10 hours.

General Electric Company, Bridgeport, Conn. July 23, page 142.

Welded-Steel Float for High Pressures

A line of welded-steel floats suitable for all steam pressures up to 1,500 lb. and hydrostatic pressures up to 2,500 lb. is now available for all types of equipment. The floats are made of a special alloy steel, with the two halves welded together and the spud welded on the outside surface. They are afterward heat-treated, polished and nickel-plated to prevent corrosion. They are available in any size from 3 to 10 in., either round or elliptical in shape and can be furnished with specially shaped spuds. Floats pressed from Monel metal, Ascoloy, Duraloy and other brands of stainless steel for pressures up to 300 lb. hydrostatic are also available.

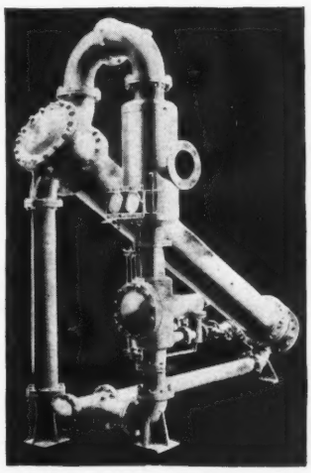


W. H. Nicholson & Company, 12 Oregon St., Wilkes-Barre, Pa. Oct. 22, page 653.

High-Velocity Evaporator

Employment of high velocity to effect entrainment separation and the elimination of customary large vapor space are features of this inclined-tube evaporator.

The unit, which is made in single- and multiple-effects, is



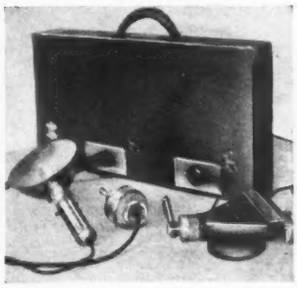
particularly adaptable to the production of boiler-feed make-up where the scale consists mainly of calcium carbonate and suspended organic matter. It is also suitable for concentrating or evaporating all liquids with the exception of those which crystallize or salt out during the process.

In operation, water or other liquid in the lower portion of the tubes is caused to evaporate and leave the upper end of the tubes at high velocity, striking the top head and throwing down much of the entrained moisture. The vapor, with some entrainment, leaves the vapor head and passes to a separator, where final separation takes place, the steam passing off to a condenser or to the next effect and the water back to the circulation.

Struthers - Wells Company, Warren, Pa. Aug. 27, page 347.

Portable Dynamic Balancing Equipment

The dynamic balancing equipment illustrated can be used for determining separately the static and dynamic unbalance in machines ranging in size from large turbines to fractional horsepower motors. The apparatus consists of a hand lamp



having a special Neon tube, a phase adjuster and a vibrometer. It is adaptable for use where it is advisable to balance a rotor running under its own power; to balance at a speed higher than that of the available balancing machine; and where a motor has become unbalanced in service, but it is inadvisable to dismantle the machine.

Electrocon Corporation, 6 Varick St., New York City. April 2, page 557.

"Rustless" Chrome-Iron Alloys

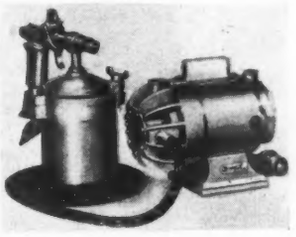
A series of four brands of rustless iron, known as "Defirust," "Special Defirust," "Defistain" and "Defiheat" are now available. The four brands are chromium-carbon alloys, and, as their trade names indicate, are manufactured for corrosion resistance, all of them containing a high percentage of chromium and a small amount of carbon.

Rustless Iron Corporation of America, 122 East 42d St., New York, N. Y. Nov. 5, page 733.

Portable Paint Sprayer

A lightweight portable electric paint spray machine suitable for touch-up work and industrial painting is illustrated. The compressor is built of aluminum and is equipped with a ½-hp. universal motor. It develops a pressure of 35 pounds.

The spray gun is equipped with two tips, one slotted for

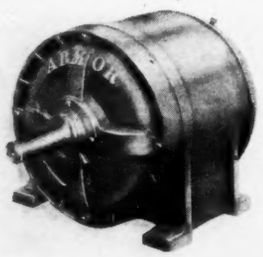


fan spray, and the other for narrow spray, covering an area of 2 in. to 14 in. in width. The machine is furnished equipped with a quart container, two tips, 20 ft. of reinforced rubber-covered cord and 8 ft. of rubber web-covered hose.

Breuer Electric Manufacturing Company, 852 Blackhawk St., Chicago, Ill. Oct. 29, page 692.

Motors, Electrical and Elevator Equipment

Improved design of totally inclosed motors, new starters and compensators with thermal protection, multi-break contacts, Deion contactors, gas-tight inclosures; and combined starters and disconnect switches with test jacks embodied in the design, characterize recent developments in electrical equipment.



Totally Inclosed Air-Cooled Motor

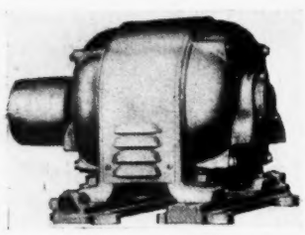
Built in sizes up to 50 hp., the totally inclosed motor illustrated is fitted with heavy cast-iron end brackets designed to increase the radiation of heat by means of heavy ribs. The housing is also designed to give maximum protection against the entrance of explosive gases or abrasive substances.

Ventilation is effected by a fan on the end of the shaft. Provision is made for taking air gap measurements at four points, and means for removing an accumulation of dirt from the interior without dismantling the motor are also provided. The bearings are of the adjustable anti-friction type.

Armor Electric Manufacturing Company, Erie, Pa. Sept. 24, page 499.

"Uniclosed" Ventilated Motor

This "Uniclosed" motor, although not totally inclosed, offers the desired inclosing features. It is provided with a pressed-steel housing, embodies



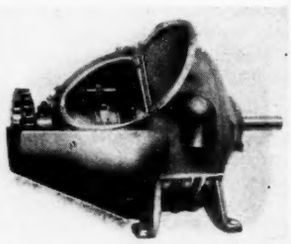
a dual fan blast, operates on the auto-start principle and has a solid die-cast aluminum rotor and ball bearings.

Ventilation is by two air streams, which are drawn through the motor by fans on opposite sides of the rotor. Each fan creates separate air currents, which meet at the middle of the frame, where the heated air is expelled on both sides through exhaust louvers in the cover.

United States Electrical Manufacturing Company, Los Angeles, Calif. Sept. 10, page 421.

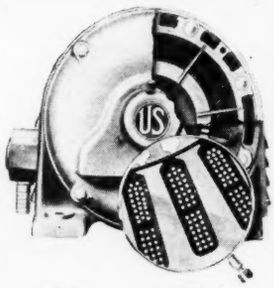
Fan-Cooled Direct-Current Motor

All mechanical parts of this new type SK motor, with the exception of the shaft, are interchangeable with parts used on the present totally inclosed motor of the same frame size. With the addition of the forced-



air cooling, the bracket openings are fitted with covers and sealed sleeve bearings are used. The commutator end of the motor is further inclosed with a sheet-steel cover which has a perforated protective end through which the fan draws the cooling air. Air is directed over the bracket and passes out over the top of the motor. The motor is adaptable to use with various types of equipment where the surrounding air is full of abrasive dust or other matter that may be injurious to the motor winding.

Westinghouse Electric & Manufacturing Company. April 30, page 718.



Motors With Asbestos-Insulated Windings

An important claim made for the asbestos form of insulation used on this line of motors, which is put out in ratings of ¼ to 125 hp., is that it does not carbonize and deteriorate under ordinary operating temperatures.

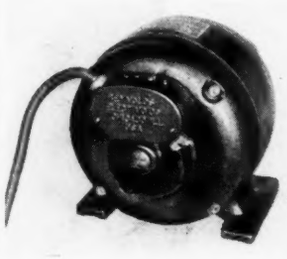
When the winding has been completed it is thoroughly impregnated with a heat-resisting compound known as "Asbestosite," a fine asbestos powder held in collodial solution by volatile diluents, which are driven off after the compound permeates the windings. By means of a special baking and curing process the asbestosite is made to harden and form a solid, intimately attached to, and isolating, the turns of the windings. Rotors are of one-piece solid-construction die-cast aluminum.

United States Electrical Manufacturing Company, Los Angeles, Calif. Oct. 1, page 533.

Motor With Built-In Switch

Fitted with a built-in switch, the motor is practically inclosed, but is adequately ventilated with a free circulation of air. Some of the important features are a frame of machined cast iron; stator of punchings pressed together under heavy pressure and riveted; rotor of indestructible squirrel-cage type, with copper end rings electrically welded to copper bars; and windings of cotton-covered enameled copper wire, inserted in insulated slots and held in place by heavy wedges. All connections are made to a terminal block located inside the motor but having the terminal screws readily accessible by removing a plate.

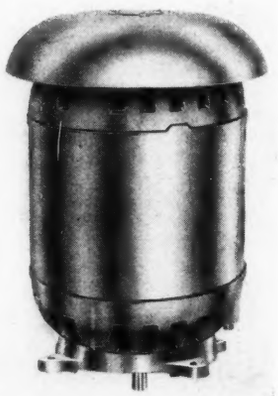
Reynolds Electric Company, 2650 West Congress St., Chicago, Ill. Nov. 19, page 806.



Small Vertical Motors

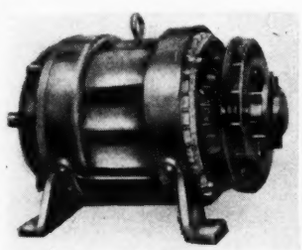
Interchangeability of the various sizes on the same mounting base is an important feature of this line of small vertical motors, which includes the repulsion-induction, the split-phase, the squirrel-cage and direct-current types. Alternating-current machines are built in 25- to 60-cycle models for operation at 1,200 to 3,600 r.p.m. The motor bearings are equipped with a labyrinth seal which prevents leakage of the lubricant into the motor winding and effects a dustproof and leakproof bearing housing.

Wagner Electric Corporation, 6400 Plymouth Ave., St. Louis, Mo. May 14, page 796.



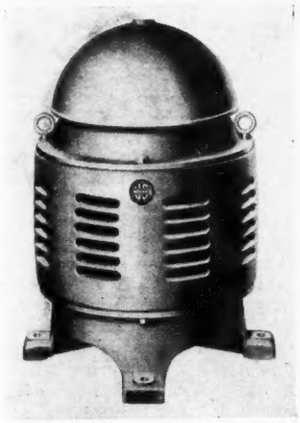
Totally Inclosed, Fan-Cooled Squirrel-Cage Motor

The construction of these totally inclosed motors is almost identical with that of the standard open motor. The stators differ only in that the ends of the windings are inclosed in sheet-metal housings. The rotors are identical except for



the addition of a machined steel collar mounted on each end of the shaft. The collars serve as supports for the external cooling fans, which draw air through the brackets at each end, direct it over the entire outside surface of the protective housing and discharge it hrough the middle section. This construction makes possible the use of short direct air passages.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Feb. 12, page 284.



Turbine Pump Motor of Symmetrical Design

In many installations of turbine centrifugal pumps the base of the pump, which rests upon the concrete at the surface of the ground, has been designed by the manufacturer to suit his needs, resulting in a rather awkward assembly.

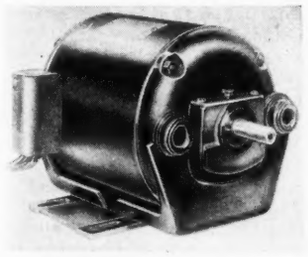
To obviate this condition the vertical motor illustrated has been introduced especially for this class of service. It is symmetrically designed, with all the operating parts fully protected. The motor is available in a number of sizes to meet practically any installation requirement.

United States Electrical Manufacturing Company, Los Angeles, Calif. Dec. 17, page 978.

Rubber-Mounted Motor

The motor proper is completely insulated from the supporting cradle-shaped base by rubber bushings. Design of the mounting is such that vibration is reduced to a minimum, the outfit is practically rigid, and shaft alignment is in no way endangered.

In addition to the mounting the motor has also undergone important alterations to improve further its quietness and electrical performance. Besides equipping the governor weights with rubber bumpers, the rocker arm has been redesigned to eliminate brush noise during



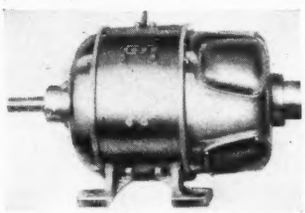
starting and stopping. The motor is of the brush-lifting type.

Wagner Electric Corporation of St. Louis, Mo. Feb. 12, page 283.

Water-Tight Motor for General Application

Although designed primarily for hoist duty, the water-tight motor illustrated is also suitable for general application in damp places. It is rated at 15 hp., 230 volts, 1,150 r.p.m. It is compound-wound for operation on direct current and is reversible.

The bracket on the pulley end of the motor is cast solid, whereas the bracket on the opposite end has four water-tight handhole covers, removal of which permits easy access to

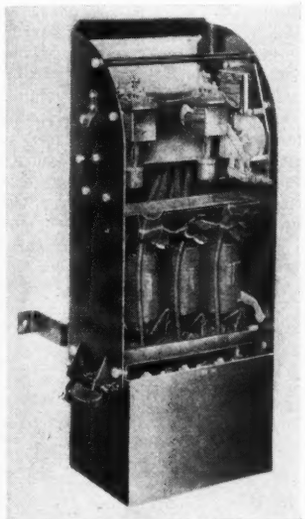


commutator brushes and rigging.

Roth Brothers & Company, 1400 West Adams St., Chicago, Ill. Feb. 19, page 321.

Starting Compensator for Use in Gaseous Atmospheres

Designed especially for use in places where there are ex-



plosive gases or gasoline fumes, this is a modification of standard equipment so designed as to eliminate exposed arcing, thereby preventing any possibility of an explosion in a dust-laden or gaseous atmosphere.

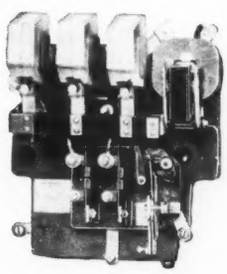
The starting switch is oil-immersed, and in place of the usual push-button tripping device a standard time-relay undervoltage attachment and dashpot relays are used, with Cooper-Hewitt mercury tubes substituted for the usual contact types of the dashpot relay. The compensator is available for use with motors operating on 25 to 60 cycles two- or three-phase circuits in sizes of 15-hp. and less for 110 volts, and 125 hp. and less for 220, 440 and 550 volts.

General Electric Company, March 26, page 521.

Linestarter Without a Cabinet

Like other linestarters put out by the company, this unit is equipped with a Deion arc quencher and a thermal overload relay. An important feature is the combined hand and automatic reset thermal overload relay. The automatic reset obviates necessity of the operator going to the starter to put the motor back on the line after an overload. Starters are available in three sizes, covering a range up to 50 horsepower.

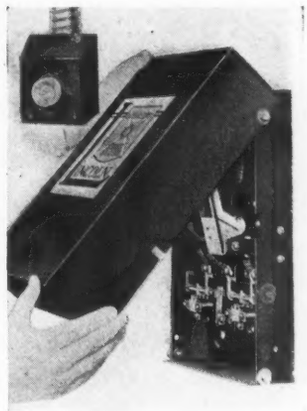
Westinghouse Electric & Manufacturing Company. Oct. 29, page 693.



Dust-Tight Linestarter

Starters included in this line are of the remote-controlled non-reversing, across-the-line magnetic type designed for use with single-phase and polyphase squirrel-cage induction motors in sizes up to 50 hp. Conduit is brought in through the top and bottom in threaded openings to make a dust-tight connection. To prevent the operator from breaking the seal whenever the motor is put back in service after an overload, the smaller-size starters are equipped with an automatic reset thermal overload relay.

Westinghouse Electric & Manufacturing Co. Sept. 17, page 457.



Across-the-Line Safety Starter

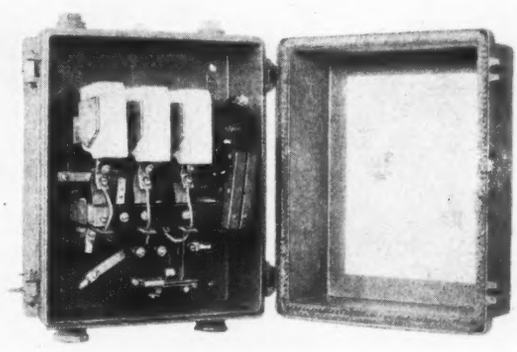
Ease of installation and ready accessibility to all operating parts are some of the advantages claimed for this across-the-line starter. A cover of the drop-hinge type incloses the entire mechanism and permits installation of starters closely grouped, two inches clearance between starter boxes being ample for accessibility. Releasing two screws permits the contactor panel to swing out, exposing the contacts. Long life is assured to the contact points by the wiping action, which prevents pitting, and by the cadmium-plated steel shields, which provide an instantaneous thermal and magnetic quench for the arcs. The relay armature has a cushion action and is provided with replaceable bronze bearings and is actuated by a coiled spring. The push button can be mounted on the side of the starter box or arranged for remote control.

Lincoln Electric Company, Cleveland, Ohio. June 11, page 978.

Redesigned Motor Starters Have New Meters and Relays

The new rectangular type of meter with non-glare glass and a new type of field-actuating relay are incorporated in this line of synchronous motor starters designated CR-1135.

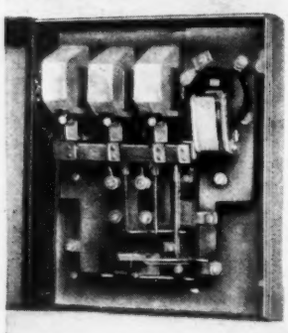
Operation of the new field-actuating relay, which controls



the field contactor, is dependent upon the speed of the motor, and, in addition, on a definite time delay after the motor reaches approximately 95 per cent speed. When full voltage is applied to the motor immediate closing of the relay contacts is prevented by a lock-out coil in parallel with the discharge resistor and energized by the voltage across this resistor.

The lock-out coil holds the relay contact arm motionless until the motor accelerates to approximately 95 per cent of synchronous speed, when voltage across the resistor decreases and allows the lock-out coil to release the timing mechanism. After a predetermined time the relay contacts close, energizing the field contactor and applying field to the synchronous motor.

General Electric Company. Oct. 22, page 652.



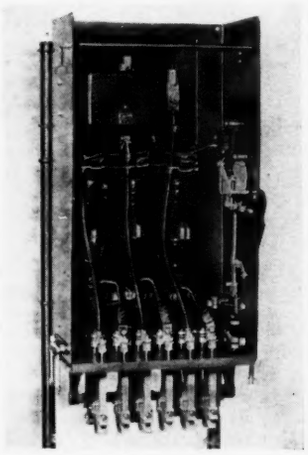
Linestarter With Deion Contactor

Increased safety, economy and rating through the use of "Deion" contactors are claimed for this class 11-200 linestarter. The "Deion" contactor is designed to confine and smother the arc quickly without the usual flash. Not only does it provide for a greater degree of safety to the operator, but it also permits a smaller inclosure and consequent decrease in over-all size of the starter. Contacts are designed to rupture at from twelve to sixteen times their normal current-carrying capacity at rated voltage under severe operating conditions of low power factor and sustained voltage.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. April 23, page 680.

Compensator With High Interrupting Capacity

Some of the features of this compensator, especially applicable to the control of high-speed squirrel-cage motors, are: A switch design providing wide break and high interrupting capacity; time-delay undervoltage release, preventing shutdown on brief power disturbance and assuring that in case of short circuit the line protective devices

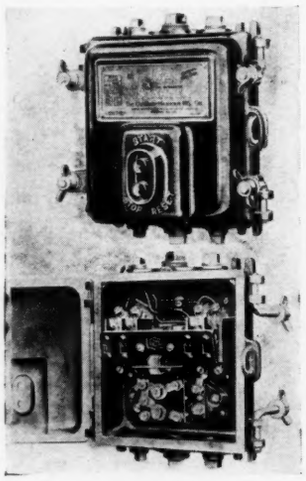


will open first; contact tips of standard contactor construction and action; cabinet construction of case for wall mounting, with ample room for ready connections and access to all terminals and parts.

General Electric Company, Schenectady, N. Y. February 12, page 285.

Dust-Tight Inclosures for Motor Starters

For motors up to 5 hp. the case of this starter is of cast iron and for larger sizes it is made of heavy welded boiler plate. A soft rubber gasket is used between the cover and case, and eyebolts with wing nuts are used to hold the cover tight. In addition to being dust-tight, the small cast-iron inclosure is also weatherproof. It has the start, stop and reset buttons



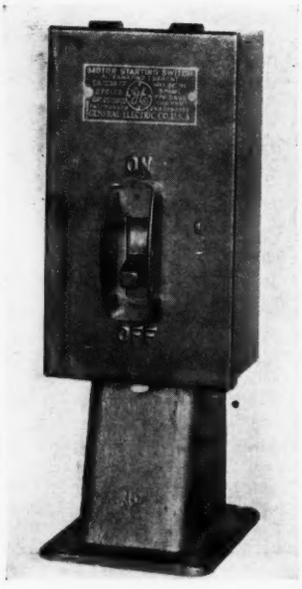
mounted directly in the cover, and is particularly suitable for installation in pulverizing plants, mines and other industries where dust in the air may interfere with the operation of a starter.

Cutler-Hammer, Inc., 190 Twelfth St., Milwaukee, Wis. June 4, page 943.

Small Across-the-Line Starter

This small manual starter consists of a tumbler switch and two small thermal cutouts mounted on a common textolite base. By suitable interlocks the switch can be locked in either the open or closed positions. Single or double pedestals on which the switches can be mounted in positions near the controlled machines are also available. Links are of tinned copper, and the contact spring and post are also tin-plated to prevent oxidation. The switch has a rating of 1 hp. at 110 volts and 2 hp. at 220 to 600 volts, three phase.

General Electric Company. July 2, page 24.

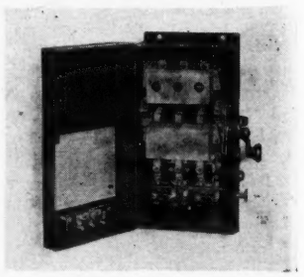


Starter With Test Jack

To provide means of obtaining load data on motors while they are running, this combination starter is arranged for the insertion of a test jack in the motor circuit while the motor is running. The starter comprises an across-the-line starter and a motor-circuit switch mounted together in one cabinet.

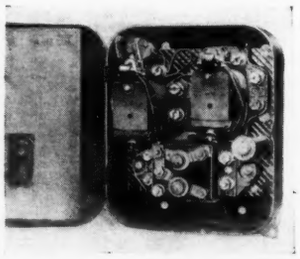
The test jack is inserted through openings in the door of the starter and passes between the jaws of the switch, where it is held by the spring tension of the switch contacts. The test jack may be ordered separately when desired, as only one is needed for an installation of several starters.

The starter is put out in three capacities and in six types, mak-



ing use of across-the-line starters of the 30-hp., 220 volts, and 50-hp., 440 and 550 volts, two or three phase.

Square D Company, Detroit, Mich. Aug. 13, page 264.

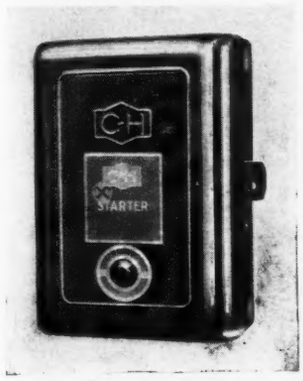


Starter for Direct-Current Motors

In this automatic, across-the line starter for general applications of direct-current motors up to 2 hp., 115 or 230 volts, two magnetic contactors, one in each side of the line, connect the motor directly across the line on starting and provide a double-line break. Contactors are designed especially for direct-current service and have renewable silver contacts.

The thermal overload relays are the same as those used in across-the-line starters for small alternating - current motors. They are the fusible alloy type and can be adapted to any size motor by simply changing the heater coils. Each starter is furnished with a push-button master switch, three-wire control.

Cutler-Hammer, Inc., Milwaukee, Wis. Nov. 5, page 733.

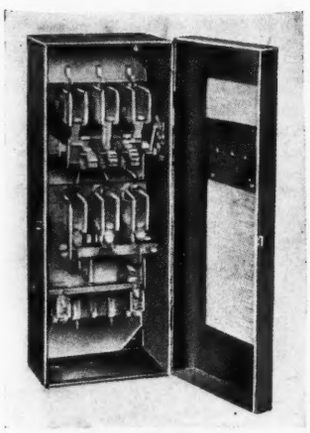


Automatic Starter for Direct-Current Motors

The counter e.m.f. type automatic starter for small direct-current motors illustrated incorporates such features as: Small size, reduced-voltage starting, thermal overload protection, low-voltage protection and renewable silver contacts. It is rated up to 2 hp., 115 or 230 volts. Each starter is supplied with a separate push-button master switch, giving three-wire remote control. Two-wire control can be furnished if desired.

The starters consist of a main-line contactor, an accelerating contactor, an armature resistor, and the thermal overload relays. The standard starter is supplied with fusible-alloy thermal overload relays and can be made applicable to various size motors by simply changing the heater coils.

Cutler-Hammer, Inc., Milwaukee, Wis. Nov. 19, page 807.

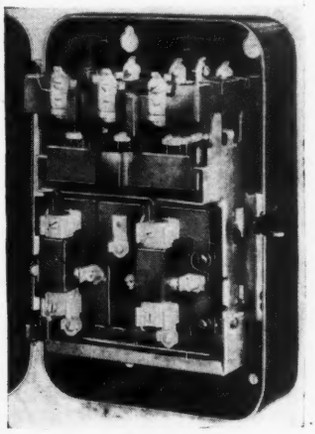


Motor Starter With Disconnect Switches and Test Jacks

The disconnect switches embodied in this starter are furnished with or without fuse clips, and the meter test jacks permit the motor to be checked for load without opening the cabinet or interfering with the operation of the motor. A mechanical interlock between the disconnect switch lever and cabinet cover makes it impossible to open the cover unless the disconnect switch is open.

Switches are rated up to 10 hp., 110 volts, 30 hp., 220 volts, and 60 hp., 440-550 volts, and are furnished in three forms: (1) With push-buttons in the cover; (2) for pilot control, and (3) with three-way lever switch.

Allen-Bradley Company, 286 Greenfield Ave., Milwaukee, Wis. Nov. 12, page 769.



Starter With Multi-Break Contacts

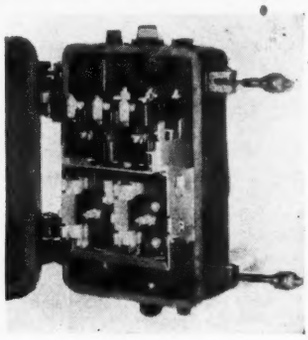
In this starter, which is designed for use with squirrel-cage induction motors in sizes up to 20 hp., 550 and 440 volts; 15 hp., 220 volts; and 7½ hp., 110 volts, the contacts are arranged so that each leg of the circuit is broken at four places. This number of breaks in series prevents arcing at the contacts. The moving contacts have a vertical motion, and as there is practically no arcing when the circuit is interrupted arc chutes and blowout coils are not required. The starter is furnished for remote control, with thermal overload relays.

Condit Electrical Manufacturing Corporation, Boston, Mass. March 26, page 519.

Gas-Tight Inclosures for Motor Starters

A gas-tight inclosing case for across-the-line motor starters is illustrated. The case, dust-tight and weatherproof, is of unusually strong cast-iron construction, with conduit connections at top and bottom. It is particularly suitable for installation in mines, pulverizing plants, chemical plants and other places where a large amount of dust or gas may be present. Provision is made for padlocking the cover shut to avoid tampering.

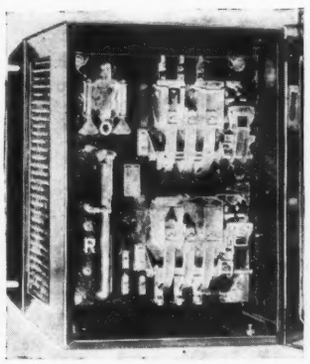
Condit Electrical Manufacturing Corporation, Boston, Mass. Jan. 14, 1930, page 70.



Starter With Thermal Timing Device

A thermal timing relay is embodied in this automatic starter using one step of primary resistance for squirrel-cage motors. The thermal relay controls the accelerating contactor's operation and the time period can be adjusted over a wide range.

With push-button starting, pressing the start button connects the coil of the main-line contactor across the line. When this contactor closes it connects the primary of the motor to the line through a resistance. This contactor provides a holding circuit for its coil so that it will stay closed when the push button is released.

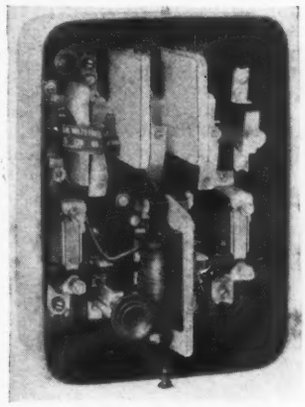


Closing of the main line contactor also connects the timing-relay transformer in series with the coil of an accelerating contactor and starts heating one leg of the relay. After a definite interval the relay closes its contact, short circuits its transformer and impresses full voltage on the accelerating-contactor coil, which then closes its contactor. When this contactor closes, it applies full voltage to the motor terminals and cuts both the timing relay and its transformer out of circuit.

Monitor Controller Company, Baltimore, Md. March 19, page 483.

Magnetic Switches Simplify Installation

One of the two switches comprising this line is a three- or a four-pole magnetic switch with self-contained "start" and "stop" stations, and the other, a switch for similar service but designed to provide large wiring space.

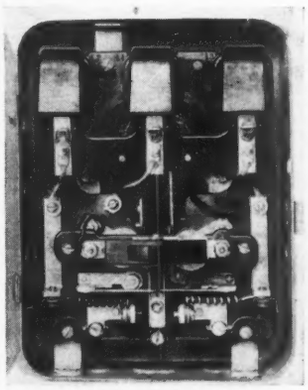


The first mentioned incorporates features for overload and undervoltage protection or release, and is used for starting and protecting small alternating-current motors that can be thrown directly on the line. It consists of a triple-pole barrier-type contactor and a double-coil temperature overload relay, all mounted on a molded base in a steel inclosing case. This switch is used where it is desired to place the control at the machine.

General Electric Company. Feb. 12, page 283.

Across-the-Line Magnetic Starting Switch

Arranged for either two- or three-wire operation, this switch can be used as a complete control for squirrel-cage motors, and is also suitable for the primary control of slip-ring induction motors. When used for the latter service, the secondary control is provided with primary contacts to interlock with the magnetic line switch.

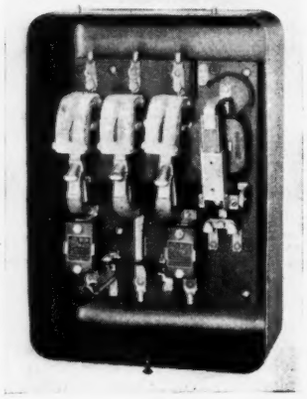


Overload protection is by thermal relays with interchangeable elements. Low-voltage protection can be had on some forms of these switches when they are operated either by a lever-type switch or by a three-wire momentary-contact push button. Ratings are available up to 7½ hp. or 25 to 30 and 50 to 60 cycles and 110 to 440 volts.

Diamond Electrical Manufacturing Company, Los Angeles, Calif. March 12, page 446.

Magnetic Switch for Across-the-Line Starting

Improvements in this new switch over the former model include the use of a molded shaft which will not stick in the bearings, thermal overload relays with interchangeable heater units, silver contacts on the holding interlock, and E-frame magnet which requires a minimum of power to operate it, and restricted-type blowouts.

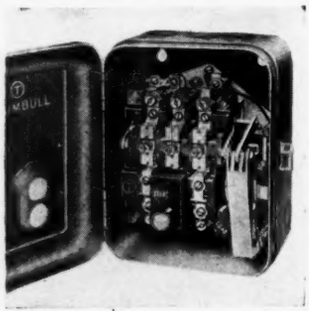


Horsepower ratings at various voltages for standard squirrel-cage motors are as follows: 110 volts, 7½ hp.; 220 volts, 15 hp.; and at 440 and 600 volts, 15 horsepower.

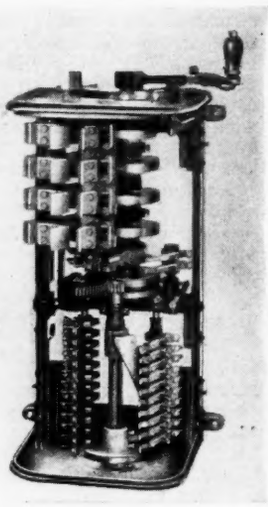
General Electric Company. July 30, page 186.

Across-the-Line Starting Switch

Interrupting capacity and ease in wiring are among the features embodied in this type M magnetic switch for across-the-line motor starting. It is of a design providing thermal protection against overload or damage due to phase failure. Regulation may be local, local-and-remote or automatic with the change of one connection on the control terminal. Another feature is compact contact construction, permitting the starter to be inclosed in a box 6½ in. wide, 8½ in. high and 4 1/16 in. deep. The interchangeable heater elements are removable from the front.



Trumbull Electric Manufacturing Company, Plainville, Conn. Jan. 21, 1930, page 114.



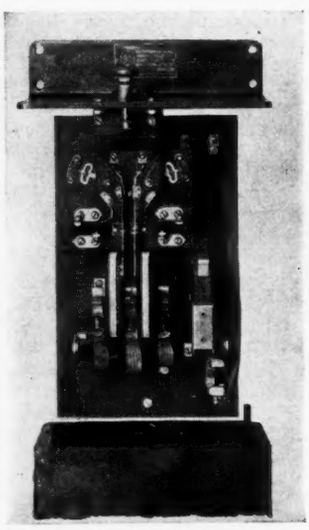
Direct-Current Cam Switch

Particularly suited for controlling auxiliaries, such as pumps, blowers and similar equipment, where the current inrush or the starting torque is not severe or where the operations are not frequent, this direct-current cam switch designed especially for non-reversing service is available in two forms. Both are for non-reversing service with an armature regulation over five points, and one form has field regulation over 22 points. The intermittent armature current capacity is 1,000 amp.

General Electric Company. April 30, page 718.

Switch With Oil-Immersed Contacts

With a capacity of 40 amp., suitable for use with any motor from 110 to 600 volts, this oil-immersed magnetic switch is designed for service in gaseous atmospheres or in locations where highly corrosive gases or acids are encountered. The contactors and interlock are standard in design, and the overload relay has oil-immersed contact tips in which the heaters are located above the top of the tank.

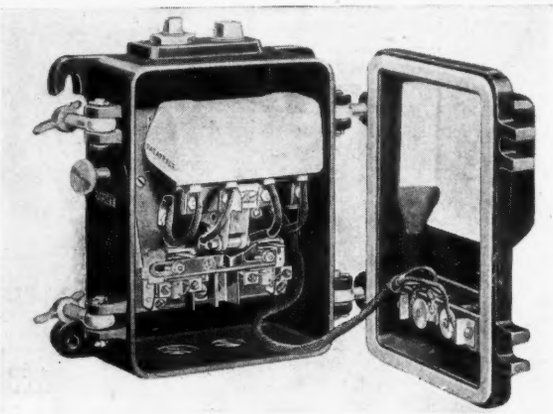


General Electric Company. Sept. 24, page 499.

Splashproof Motor-Starting Switch

Designed especially for use in plants and industries where wash-down of equipment is essential or where excessive moisture or dust is present, this splash- and dust-proof starting switch is rated up to 3 hp. 110 volts, 5 hp. 220 volts, single-phase, and 7½ hp. 440 and 550 volts for polyphase motors.

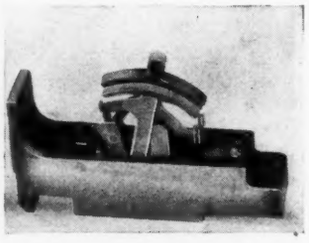
It is equipped with two resisto-therm relays, which provide overload and phase-failure protection and which can be reset without opening the cabinet. The switch is furnished in three forms.



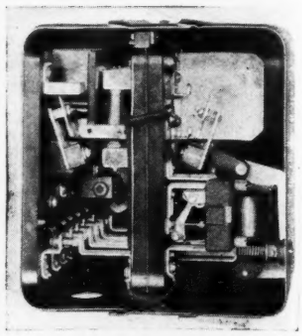
Allen-Bradley Company, 286 Greenfield Ave., Milwaukee, Wis. Nov. 19, page 808.

Small Circuit Breaker for Panelboard Duty

Continuous carrying capacity of this breaker is 15 amp. In effect, the device is a renewable fuse, the interrupting ability of which provides for safe use on any system of its rated voltage, regardless of connected overload. It has an inverse time-element trip, permanent calibration and contact resistance, and is particularly intended for automatic panelboard duty.



Westinghouse Electric & Manufacturing Company. March 26, page 521.



Combined Starting Switch and Fuses

Consisting of three sections: A back portion containing a motor-circuit switch, a middle portion on which is mounted the magnetic switch and fuse clips, and the front cover—this switch is designed to take the place of the magnetic switch, motor-circuit switch and inclosed fuses usually required in controlling the operation of a motor. No flexible connections are used between sections.

Overload protection is provided by two-temperature overload relays, and a holding interlock which permits its use with a "start-stop" momentary-contact, push-button station is also used.

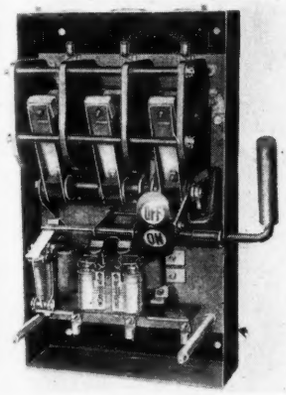
General Electric Company. May 14, page 795.

Fully Inclosed Circuit Breaker

This type EAF breaker is essentially a non-closable non-overload device designed primarily for industrial work. It is built in either two- or three-pole combinations, the overload coils being standard equipment in either case. The two and three pole breakers are exactly the same size, the only difference being that the center pole is omitted in the case of the two-pole combination. The overload trip consists of electromagnets whose armatures may be set at different points of calibration by means of two set-screws. The overload coil units are such that they may be

replaced in the field, either with others of the same size, or ones of a different capacity.

Time-limit protection is afforded by simple dashpots which give quick resetting and are free from oil overflow. The breaker is available in capacities from ½ to 80 amp. 250 volts

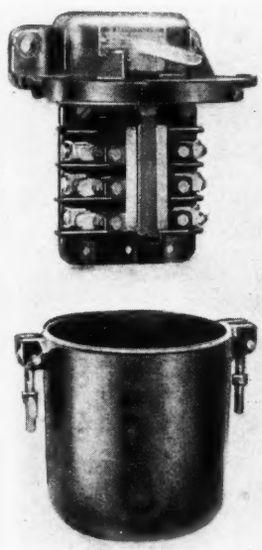


direct-current and 550 volts alternating-current.

Roller-Smith Company, 233 Broadway, New York City. Feb. 26, page 364.

Oil-Immersed Across-the-Line Switch

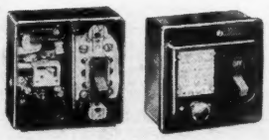
A molded compound switch base carries the stationary contact stud parts, and the moving contact assembly is mounted on another one-piece molded part. The contacts are of the silver-



to-silver, double-break type, which, with the molded arm, eliminates shunts or drum-type contacts.

The cover is provided with two mounting holes, making the switch suitable for wall mounting. Provision is made for conduit connection by means of an incoming conduit box cast into the cover.

General Electric Company. March 12, page 445.



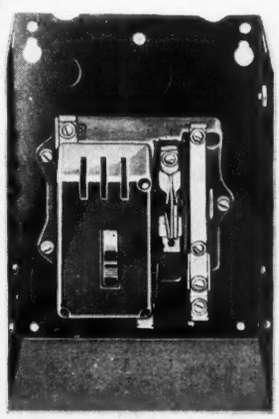
Overload Breaker for Small Motors

Designed for use with motors driving small machines and auxiliary equipment, such as pumps, compressors, fans, etc., the overload breaker illustrated is being put out in six forms and in capacities up to 1½ hp. at 220 volts. It is suitable for use with direct-current motors and alternating-current single-phase and polyphase motors.

Allen-Bradley Company, 286 Greenfield Ave., Milwaukee, Wis. Sept. 24, page 498.

Meter Service Breaker Replaces Fuses

Some of the features of this breaker are front manual operation, which enables the breaker



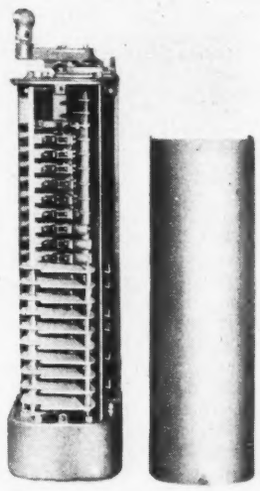
to be banked more closely and recessed; quick make-and-break, which banishes contact burning and variable action; front operating handle fully insulated and shock-proof. The handle indicates the "on," "off" and "tripped" positions and can be locked or sealed in the "off" position. It is furnished with the proper setting and nothing can be done to alter its performance. It is made for 30 amp., 125-volt, 2-wire solid-neutral service.

Square D Company, Detroit, Mich. Dec. 31, page 1051.

Reversing Drum Controllers

Steel parts have replaced castings wherever practicable in these new reversing drum controllers designed for operating cranes, bending rolls, and for other heavy-duty work. They are made for alternating- and direct-current service.

The drum cylinder has rolled brass supporting disks assembled on a micarta-insulated steel shaft between brass and micarta collars. The fingers are self-aligning, and adjustment may be made to compensate for wear. Copper shunts from the terminals to the finger tips prevent localized heating at the joint. A ball thrust bearing in the base and a flexible roller



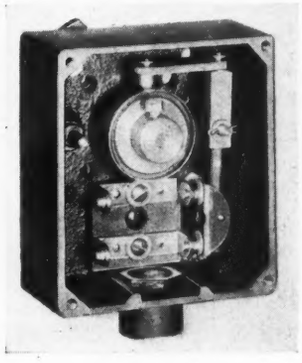
bearing in the top allow easy operation of the controller.

Westinghouse Electric & Manufacturing Company. July 23, page 142.

Motor Controller and Brake Switch

This brake switch is arranged for mounting on the end bell of the motor and for operation from the motor shaft. Its function is to cut off reverse torque when the motor comes to rest. The switch is entirely mechanical in operation. There is a collar on the end of the motor shaft which contacts with a concentric and holds closed contacts controlling the brake switch. Once the motor stops, the first motion to reverse opens the brake switch and shuts off the reverse torque. Used with an automatic controller it maintains full braking torque until the motor stops.

Monitor Controller Company, Baltimore, Md. Oct. 29, page 692.



Safety Control for Motors

Suitable for use with practically all types of electricity-consuming devices, whether alternating or direct current, and with practically all types of magnetic, thermostatic or pressure primary control units, this control differs from the regular across-the-line starting switch in that it is connected in but one side of the circuit and the coils are energized only momentarily during the period of operation.

It consists of two electromagnets and a main load contactor. When energized the closing coil draws the main contactor closed, where it is locked in position by a latch. The contactor can then be opened only by energizing the

upper coil, which lifts the latch and frees the contactor. No transformer is required with the load or control contacts.

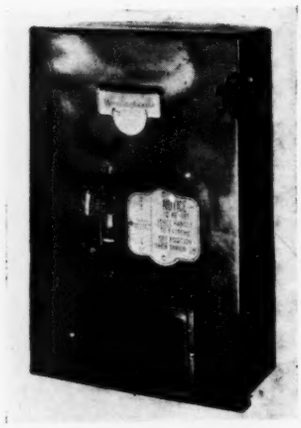
Ross Safety Switch Corporation, 1 East 42d St., New York City. Sept. 17, page 458.

Explosion-Tested-Type Controller

To meet the requirements of the United States Bureau of Mines for explosion-tested equipment, this drum type controller has fuses mounted in-

side of the case and interlocked with a screw-type cover. Accessibility results from mounting the entire controller on the bottom base. The base is threaded to screw into a cylindrical case. Removing this case uncovers the whole controller.

Westinghouse Electric & Manufacturing Company. July 9, page 63.



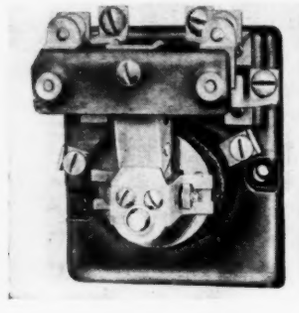
Meter Service Breaker Replaces Fuses

For use on meter services in place of fuses, this breaker is designed to withstand temporary overloads but to open the line before any damage can be done to the equipment or to the insulation of the conductors. It is operated by a quick-make, quick-break toggle switch and is controlled from the front by an insulated handle, which can be locked or sealed in the "off" position if desired. The self-heating bi-metal operating the latch on the breaker will not fuse on any overload current that can be obtained at the rated voltage. The breaker is for 30-amp. 125-volt, 2-wire, solid-neutral service.

Westinghouse Electric and Manufacturing Company. Oct. 22, page 651.

Small Alternating-Current Contactor

For apparatus requiring an automatic control switch of small capacity, the No. 701 contactor illustrated is particularly adapted. It is provided with aluminum contacts, and



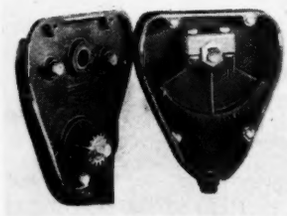
the entire assembly is mounted on a molded Bakelite base. All switch parts are cadmium-plated to prevent corrosion. This switch can be provided for operation on 6, 12, 24, 110, or 220 volts and for any frequency from 25 to 60 cycles. Current ratings range from 15 to 30 amperes.

Allen-Bradley Company, 286 Greenfield Ave., Milwaukee, Wis. July 9, page 62.

Drum Switch-Operating Mechanism

This mechanism, which supersedes the rack-and-pinion underlever type, is designed to eliminate trouble usually experienced in keeping a perfect line-up between the shaft of the operating mechanism and the drum switch shaft.

The device consists of a pinion on an extended drum switch shaft, meshing with a segment gear, all housed in a dust-tight casing that has a plugged access hole for gear slushing and a short level arm projecting below the case. The

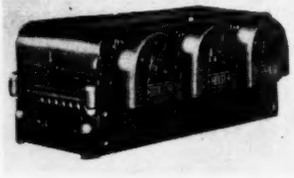


lever arm can be connected with the reach rod in the same way as was the old rack-and-pinion type.

General Electric Company. Sept. 17, page 457.

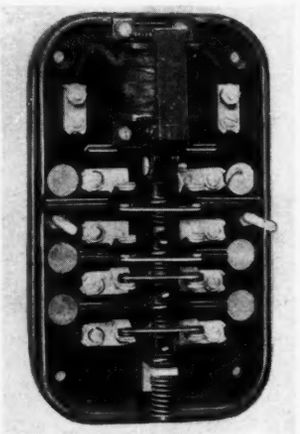
Controller for Low-Head Cranes

Self-contained, with a resistor mounted on the back for floor operation of the three motions of small, low-head cranes, this triple-drum con-



troller is similar to that of the standard line put out by the same company. A horizontal handle arrangement is provided in case it is desired to install the controller in a crane cab for the usual method of manual operation. There the resistor can be separated from the drum switches, which is necessary if all three motors are rated the full 10 hp. of the controllers.

General Electric Company. Dec. 24, page 1013.



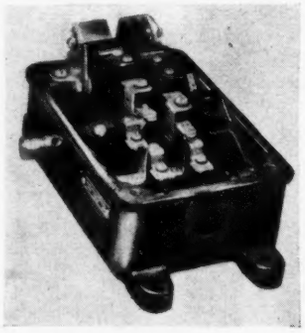
Multi-Finger Relay

The multi-finger relay illustrated has been designed for remote control of a number of independent alternating current circuits. It consists of a series of double-break silver-faced fingers operated horizontally and controlled by a small solenoid. Power consumption of the solenoid is 8 watts. Creepage and clearance for 550 volts have been provided, and the contacts will carry 15 amp. continuously.

General Electric Company. Aug. 6, page 222.

Limit Switch for Industrial Control

A two-circuit switch that can be made either normally open or normally closed, or one



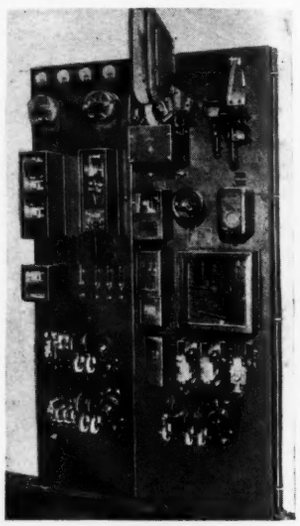
circuit open and one closed, is illustrated. It is a snap-action, cam-operated device and can be obtained with either spring or star-wheel return, with any one of three operating levers: a roller lever with a 1- or 3-inch roller, a forked lever or a straight lever. The contact tips are interchangeable with those of standard cam-operated master and geared limit switches made by the company.

General Electric Company. Oct. 29, page 693.

Mine Switching Equipment

This new design of automatic switching equipment is intended for use with motor-generator sets rated 50 to 300 kw., 2,300 volts, alternating-current, and 275 volts direct-current. Like older forms, it automatically controls starting and stopping sequence and at the same time affords protection to the machine and equipment while starting and during operation. A stub-multiple reclosing feeder connects the generator to its load and likewise protects the machine against abnormal direct-current overloads.

Protection is provided at all times for the machine and equipment, against the following abnormal conditions of operation: Alternating-current overcurrent; alternating-current undervoltage; single- or reverse-phase voltage; direct-



current overcurrent; direct-current reverse polarity; reverse power; direct-current undervoltage; incomplete start; loss of generator excitation; overheated bearings; overheated windings; phase unbalance; overspeed; underspeed, and high direct-current bus voltage.

General Electric Company. June 18, page 1016.

Undervoltage Devices Operate After Time Interval

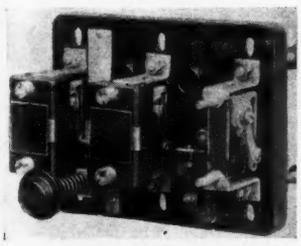
This undervoltage device is especially adapted for motor and synchronous converter service where it is desired to have the oil circuit breaker open when voltage fails or drops below a

certain percentage of normal voltage for an appreciable time.

Each device contains a motor, a helical spring and a gear train. In operation, the motor runs and keeps the spring compressed through the gear train. Upon drop of voltage the spring reverses the motor and runs the gear train in the opposite direction. If the undervoltage persists, the travel along the gear train is completed and the circuit is broken by means of a tripping device. The time interval between the initial voltage dip and the breaking of the circuit may be varied by means of adjustments to the gear travel.

The undervoltage device shown at the right is of the solenoid and plunger type, with an air bellows for time delay.

General Electric Company. Feb. 19, page 323.



Relays With Renewable Heating Element

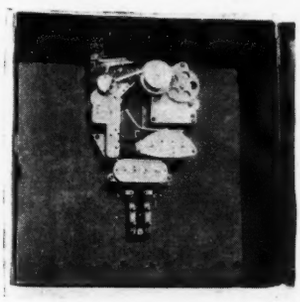
In this temperature overload relay the heating elements can be removed and inserted easily and a third relay unit can be added on the same base when it is desired to protect three legs of a circuit. Both forms are rated at from 30 to 150 amp. and are available for either front or back connecting. The back-connected types are for panel mounting.

An electric reset is provided as an accessory. Where there is sufficient space, the reset relay can be mounted on the panel itself.

General Electric Company. Feb. 19, page 321.

Maximum Demand Controlled Automatically

To control maximum demand automatically, a device known as a "Limuter" has been developed. It is for automatically cutting off or reducing the power load where the plant machinery will permit, to a predetermined value whenever the load tends to increase the demand above a desired maximum.

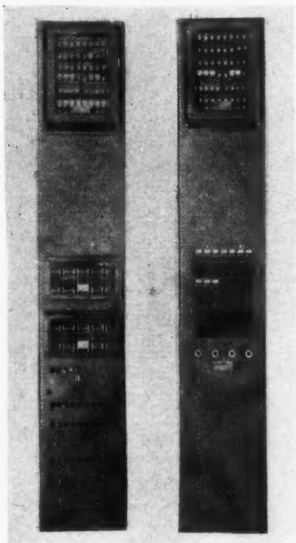


The demand period of the "Limuter" may be set to correspond to the demand period of the power company's meter, such as 5, 15, 30 or 60 min. The demand limiter, being maintained in synchronism with the demand meter, allows full power load up to the time that the demand for the period is about to be exceeded, and then reduces the load to the desired amount. There is also a totalizing register on the demand limiter, which serves as a check on the watt-hour meter.

Steelcity Furnace Company, Pittsburgh, Pa. March 5, page 404.

Synchronous Visual Supervisory Control

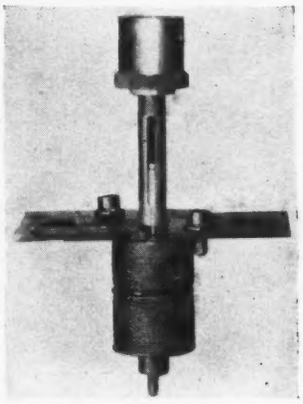
Provision for any number of remote metering and synchronizing indications as well as any number of remote control operations and supervision indications—all over the same four line wires—is made in this control system. The equipment is all-relay, and any number of apparatus units in systems of any size may be placed under the control of a single dispatcher. The apparatus, normally at rest, is started either by the dispatcher or when an automatic operation takes place in the substation being controlled.



Westinghouse Electric & Manufacturing Company. June 4, page 943.

Time-Delay Device

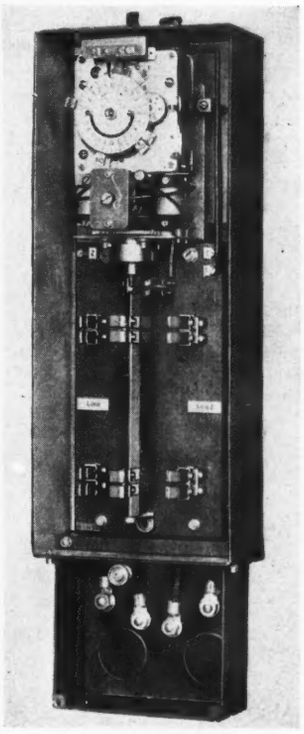
Designed for use with manually operated switchboard oil circuit breakers, this device, which consists of a coil, a calibrating tube and a piston dashpot, can be used in place of a relay where a time delay, not necessarily exact or selective, is desired. Current adjustment is made by setting the armature at the desired ampere value marked on the tube. Time delay is varied by changing the size of the opening in the piston valve.



General Electric Company. Aug. 13, page 264.

Self-Winding Time Switch for Circuit Control

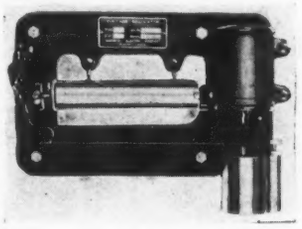
In the "Sauter" single-throw self-winding time switch illustrated, used to turn "on" and "off" blowers, ventilators and other electrical circuits that can be operated on a predetermined time basis, the main switch is motor-operated, air-break, rotary and self-winding. Motor is of the universal series-wound type, with jumper arrangement on the field coils to permit operation on 115 and 230 volt direct current or alternating current of any frequency. The clock has a four-day mainspring, but is rewound automatically twice every 24 hr. The clock can be furnished with a Sunday cut-out.



R. W. Cramer & Company, Inc., 136 Liberty St., New York City. Oct. 15, page 612.

Automatic Voltage Regulator for Generators

An automatic voltage regulator for alternating- and direct-current generators consisting of a carbon pile resistance unit is illustrated. The carbon pile is compressed by gravity and released by an electromagnet.

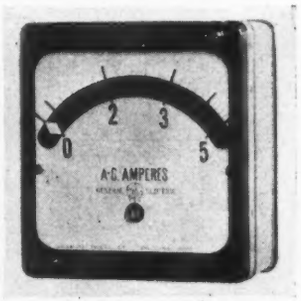


In conjunction with large direct-current generators, and exciters for large generators the regulator is used to adjust the speed of an adjustable-speed motor-driven rheostat or magnet-operated rheostat. It can also be used as a speed regulator on adjustable-speed, shunt-wound, direct-current motors in paper-making machinery.

Marshall Electric Company, Elkhart, Ind. Nov. 19, page 808.

Switchboard Instruments With No-Glare Glass

Special glass in combination with anti-parallax scale and pointer facilitates reading regardless of the angle from which the instrument is viewed. The instruments are uniform in size and appearance for both alternating-current and direct-current.

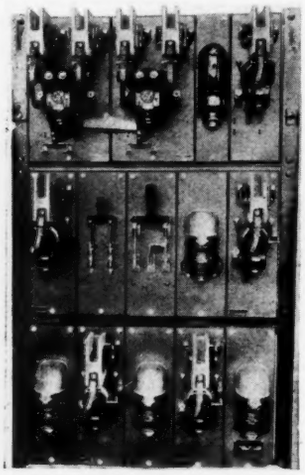


They are 6 in. high, 5½ in. wide and 3½ in. deep, making it possible to mount four instruments across a 24-in. switchboard panel.

General Electric Company. June 25, page 1055.

Time-Current Control System

The time-current acceleration relay used on this control system has the advantages of usual systems of acceleration, and on light loads and drives where fast operation is necessary its control gives maximum output. On heavy loads accelerations up to two seconds per step can be had automatically without any



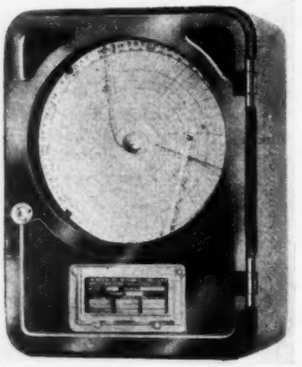
change in adjustment. On normal loads the forced acceleration increases the torque gradually until the motor starts. A complete line of shunt contactors and a plugging relay, as well as the time-current acceleration relay, are embodied.

Electric Controller & Manufacturing Company, Cleveland, Ohio. March 12, page 446.

Round-Chart Recorder

Designed for use where it is essential that the instruments be grouped with as little waste of space as possible, this small-sized round-chart recorder is available with either of two forms of measuring element, a moving-coil type and a moving-iron type. The moving-coil type is used where a complete scale is required, the graduations gradually widening as the upper ranges are approached. The moving-iron type of element provides uniform width of graduation.

Bristol Company, Waterbury, Conn. Oct. 1, page 534.



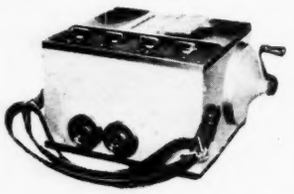
Portable Meters in Carrying Case

Sets of three portable direct-current instruments for general testing purposes are made available in a leather carrying case 6½ in. wide, 8¾ in. long and 7¼ in. deep. The instruments, which occupy separate compartments in the carrying case, are enclosed in molded micarta, and each is 4½x4½x2 in. in size.

Westinghouse Electric & Manufacturing Company. Aug. 6, page 223.

"Bridge-Meg." Resistance Tester

This instrument, called a bridge-meg, combines in one unit facilities for making Wheat-



stone bridge measurements of conductor resistance at 250 volts, and also megger tests of insulation resistance at 500 volts. It weighs only 12¾ lb., and measures 7x8¾x12 in. It includes the necessary dial resistances for bridge tests, a direct-reading ohmmeter for megger tests, and a 500-volt direct-current constant-pressure hand generator for current supply. The range of measurement covered by the "bridge" is from 0.01 ohm. up to 999,900 ohm., and the meg range is from 10,000 ohm. up to 100 megohms. Change from bridge to meg, and vice versa, is made by merely turning a two-position dial.

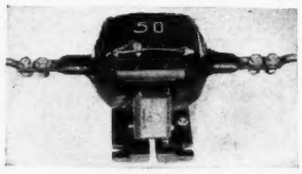
James G. Biddle, 1211 Arch St., Philadelphia, Pa. Oct. 29, page 691.

Transformer With New Type Steel Core

Hipernik instead of silicon steel has been used for the core in this transformer, giving greater accuracy and lighter weight for a given capacity. The primary coil is wound of light copper strap, and in sizes up to 100 amp. is provided with the same terminals, which are a copper strap ¼x1 in. drilled to take a two-bolt terminal. The primary coil is insulated from the secondary coil sufficiently to withstand a test of 20,000 volts.

End frames are provided with feet suitable for mounting the transformer on a flat surface, or transverse or parallel pipe framework by means of standard U-bolts. The transformer is available in sizes ranging from 5 to 1,200 primary amperes.

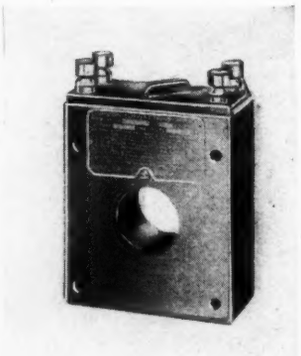
Westinghouse Electric & Manufacturing Company. April 2, page 558.



Small Transformer With Range-Changing Switch

When used with a proper instrument, current measurements can be made with this transformer from 0.2 to 200 amp. It has four self-contained primary ranges of 2, 5, 10, and 20 amp., which are changed by a range-changing switch on the top of the transformer. Ranges of 200, 100 and 50 amp. are also available by passing the conductor one, two or four times through the hole in the transformer.

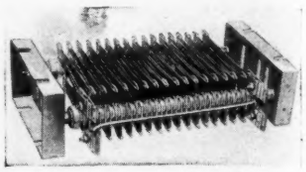
Weston Electrical Instrument Corporation, Newark, N. J. April 2, page 559.



Unbreakable Resistor

Vibration-proof, unbreakable, non-corrodible and light weight are some of the characteristics claimed for this resistor with a continuous resistance element, especially designed for severe service.

The element consists of two continuous strips of a rustproof, non-corrodible alloy proportionally ribbed on the sides and turning edges. An improved method of supporting the strips,

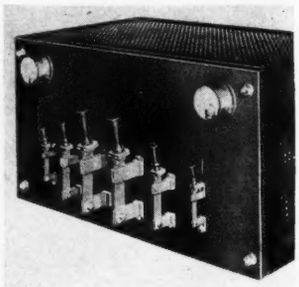


combined with the ribbing, permits the strips to expand and contact freely during temperature changes. All Dur-ristors, regardless of ampere rating, are of equal size, the thickness of the resistance strip being the only part that varies in size according to ampere rating.

Cutler-Hammer, Inc., Milwaukee, Wis. Sept. 17, page 459.

Cast Grid Rheostat

Especially designed to withstand plating fumes and acids, this rheostat affords regulation of both voltage and current according to the generator voltage and character of plating. It reduces heating to a minimum and eliminates high-resistance joints,



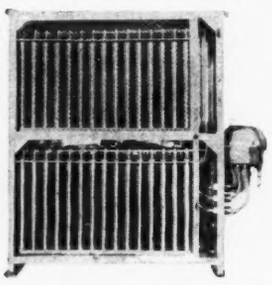
breakage and loose connections at point of contact.

Columbia Electric Manufacturing Company, 1292 East 53d St., Cleveland, Ohio. April 16, page 641.

Improved Cell-Type Capacitor

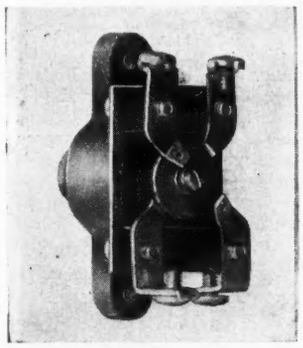
To meet increasing demand for power factor corrective devices, this improved line of cell-type capacitors suitable for standard voltages and frequencies and for use on single-, two- or three-phase circuits has been developed.

Desired capacity is obtained by connecting the required number of cells in parallel. Individual units are wound in cylindrical form, with interleaving layers of tissue and aluminum foil. After treating and im-



pregnating, rolls are rigidly mounted on a supporting rack and sealed under oil in a welded sheet-steel cell. Each roll is provided with a cut-out, so that injury of a unit roll will not interrupt the operation of the capacitor. Individual cell-type capacitors for small induction motor correction are also available.

Electric Machinery Manufacturing Company, Minneapolis, Minn. Dec. 31, page 1049.



New Push-Button Units

For use with elevators and conveyors, and in other applications where a control station is desired as a built-in unit, compactness combined with ease of mounting, flexibility of arrangement and time saved in wiring makes this unit practical for industrial control applications. The frame on which the mechanism is mounted is of black micarta, and the operating button can be either black or red.

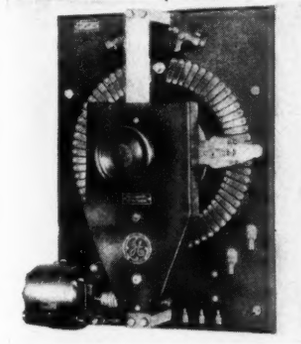
Westinghouse Electric & Manufacturing Company. Jan. 14, 1930, page 68.

Radial Switches With Renewable Segments

Radial rheostat switches, for general application where the current is more than 50 amp. and not over 300 amp. are included. There are five forms—for hand, sprocket, gear, solenoid and motor operation. By removing two screws any segment may be taken off without disturbing the resistor leads. The segments may be reversed for increased service.

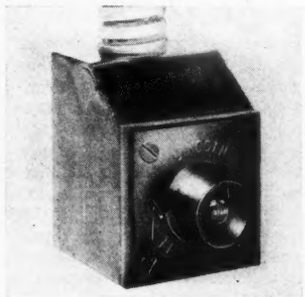
The switch designed for 100-amp. service has 65 divisions, the 200-amp. switch has 48 divisions, and the 300-amp. switch has 40. All switches of a given current rating have the same number of divisions. For the smaller hand- or sprocket-operated devices, a 50-division switch is available.

General Electric Company. Feb. 19, page 322.



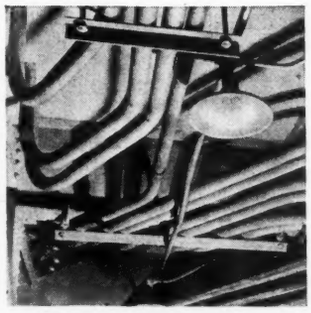
Start Button Contained in Stop Button

Design of this push button is a departure from the usual. A ball-top start button is contained inside a large stop button which projects over the former. Thus the stop button protects the start button from accidental contact. The start button can be operated only by inserting a finger inside the stop button. The push buttons are colored in accordance with the accepted standard signal colors for control. The start button is of



vivid green molded Bakelite, with the word start in white letters across its face. The surrounding stop button is of brilliant red molded Bakelite. This push button is suitable for use with any type of push-button starter.

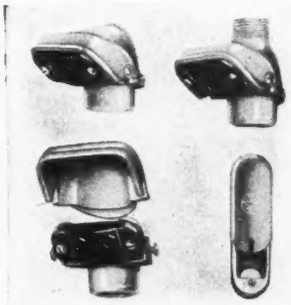
Lincoln Electric Company, Cleveland, Ohio. Feb. 5, page 244.



Aluminum Rigid Conduit

Aluminum conduit is particularly adapted for all electrical work in salt-water districts and where electrical installations are subject to attack from certain chemicals and their vapors. It is made from drawn seamless tubing of an aluminum-manganese alloy. The latter has mechanical properties higher than those of commercially pure aluminum, and is equally resistant to corrosion. It is produced in standard iron pipe sizes, and its dimensions are identical with those of steel conduit. It is furnisher in ten-foot lengths, and is enameled inside to conform with standard practice. On applications requiring seamless or jointless runs, lengths up to 40 ft. can be furnished upon specification.

Aluminum Company of America, Pittsburgh, Pa. July 16, page 105.



New Line of Conduit Fittings

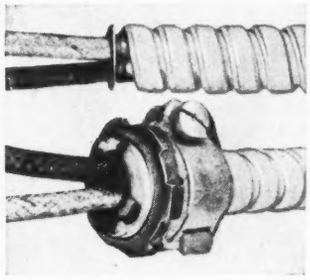
Three types of fittings are included in a complete line in which the composition cover need not be removed to pull the wires. Each fitting is equipped with a metal cover which when removed allows the wires to be pulled practically straight through the fitting. Then the ends are pushed through the composition cover, instead of its having to be threaded on.

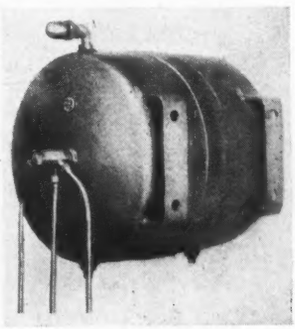
Adalet Manufacturing Company, 4610 St. Clair Ave., Cleveland, Ohio. Sept. 17, page 458.

Double-Armored Bushed Cable

On this new cable the wrapping between the conductors and the steel can be stripped and trimmed by hand without the necessity of cutting with a sharp instrument, as has to be done when the covering is a braid or weave. Also, an insulating bushing of red fiber is inserted at the end between the conductors and the steel armor. The bushing has a longitudinal gap to permit its being clasped over the conductors.

National Electric Products Corporation, Pittsburgh, Pa. Aug. 20, page 298.





Pressure-Type Oil Reservoir for High-Tension Cable

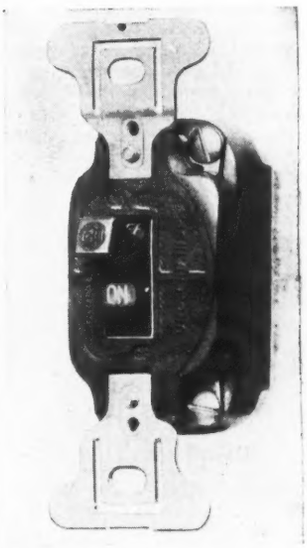
To take care of expansion and contraction of oil resulting from cyclic change in load and seasonal temperature, a new oil pressure reservoir has been developed.

The tank, of galvanized metal, contains gas-filled, metallic cells with flexible corrugated walls. When the cable is heated, the oil in it expands and is forced out into the reservoir. The oil contracts when the cable cools, and the oil in the reservoir is forced out into the cable by the pressure built up during the heating cycle.

General Electric Company, July 9, page 62.

"Rubber-Mounted" Toggle Switch

In this totally enclosed, toggle-type flush switch designed especially for quiet operation the mechanism, which is mounted directly upon two soft

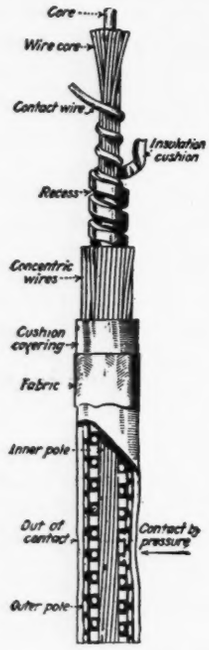


rubber pads, has non-stubbing contacts and compression-type lubricated spring. It is made in single- and double-pole, three- and four-way types, with standard mounting throughout.

Cutler-Hammer, Inc., 190 12th St., Milwaukee, Wis. Aug. 20, page 299.

Contact Cable for Remote Control

A type of waterproof cable which by pressure upon any point throughout its length



serves as a switch or contact device is illustrated. Two conductors, inclosed by the outside insulation, are left bare, but are separated from each other by an "isolating cushion" of rubber. When pressure is applied this cushion yields and permits the outer conductor to contact with a wire which is always in contact with the inner conductor, thus closing the circuit. When pressure is relieved the isolating cushion returns the outer conductor to its normal position.

Among the uses to which the cable can be put in a power plant is emergency control along a coal conveyor; for when used with a relay switch the cable becomes operative at the point of pressure, wherever the operator happens to be standing. This obviates the necessity of having to reach a push-button station before the conveyor can be stopped.

Bishop Wire & Cable Corporation, 420 Lexington Ave., New York, N. Y. Jan. 21, 1930, page 116.

Fuse Pullers of Laminated Fiber

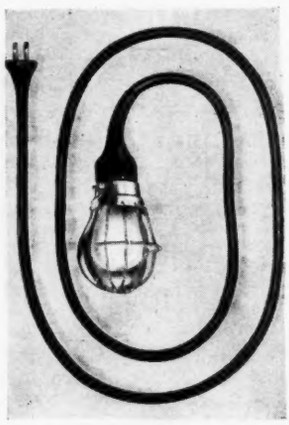
The line of fuse puller shown includes four sizes: The "Midget," with three laminations and 5 in. long, for handling small fuses of $\frac{3}{4}$ to $\frac{1}{2}$ in. in diameter; "Pocket," with five laminations and $7\frac{1}{2}$ in. long for fuses from 0 to 200 amp. at 250 volts; "Giant," with seven laminations 12 in. long, for fuses from 100 to 600 amp., 250 volts; and "Jumbo," made with nine laminations 20 in. long, capable of handling fuses from 200 to 800 amp. at 250 volts, or corresponding fuses of the 600-volt type.

In addition the tool is adapted to adjusting loose cut-out clips handling laboratory test tubes and live electrical sparks.

Ideal Commutator Dresser Company, Sycamore, Ill. May 14, page 796.

Rubber-Sheathed Extension Lamp Set

The extension lamp set illustrated is completely sheathed with soft rubber from terminal



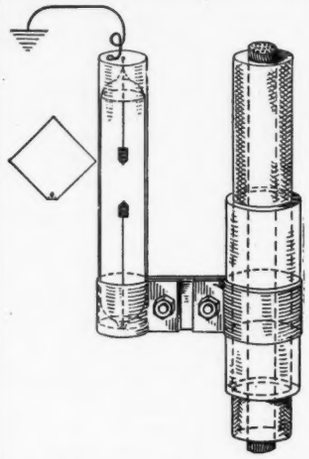
to terminal, thus making it liquid- and moisture-proof. The lamp socket is heavily protected and the shell of the socket and the contact points are cadmium-plated to prevent corrosion. It is made in standard lengths of 20, 25 and 30 ft.

Resilient Terminals Company, Oakland, Calif. May 14, page 796.

High-Voltage Indicator Uses Neon Tube

Comprising a sensitive Neon discharge tube equipped with special electrodes and assembled in a glass housing capped with brass ferrules, this voltage indicator when installed on a line conductor glows at comparatively low voltages.

In voltages between 2,000 and 4,000 a ground connection is used and the tube is set in the looped end of a metal strap. When used on conductors carrying a voltage above 4,000 there is no ground connection and no additional insulation is used between clamp and conductor. If the cable is lead sheathed the sheath is removed where the clamp is attached.



device measures $4\frac{5}{8}$ in. long by $\frac{7}{16}$ in. in diameter.

Martindale Electric Company, 1260 West 4th St., Cleveland, Ohio. July 23, page 141.

Armored Cables of Large Diameters

Power and control cables in large diameters, with interlocked flexible metal armor for installations without a conduit in central stations, industrial and other interior wiring, are now available in lengths up to 2,000 feet.

It can be run along walls, between partitions and under floors without the use of ducts, and construction of the armor is such that turns can be made easily. Cables can have any number and combination of conductors, and any outside diameter up to three inches.

The armor is a layer of overlapping and interlocking metal tape, either galvanized steel or aluminum, so applied that the cable is mechanically protected under reasonable conditions.

General Electric Company. Sept. 10, page 420.

Live or Dead Indicator for High-Voltage Conductors

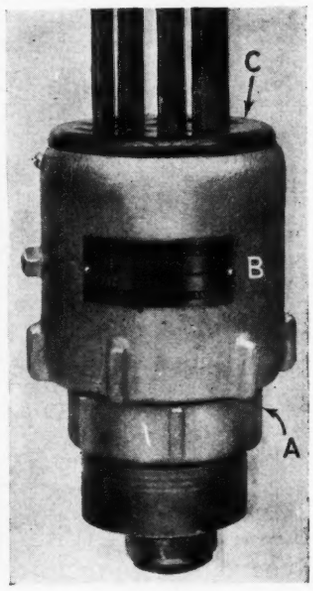
To provide a ready and safe means of determining whether conductors above 2,300 volts are alive or dead, a device designated the "Glowtector" is available.

The indicator is a rare gas tube fitted in a bakelite assembly. When the assembly is applied to a live line or bus the tube glows. A hood shields the tube from the outside light, permitting it to be used in brightly lighted rooms or sunlight. A three-foot extension stick permits the operator to stand at a distance from the conductor and also to reach out-of-the-way lines.

W. S. Wilson Corporation, 123 Varick St., New York City. July 16, page 104.

600-Volt Cable Terminators

Made for all standard sizes of conduit and for either single- or multiple-conductor cable, this "cable terminator," designed especially for sealing the ends of low-voltage lead-covered cables where they come out of conduits, can also be furnished for mounting directly on the cable without conduit. They

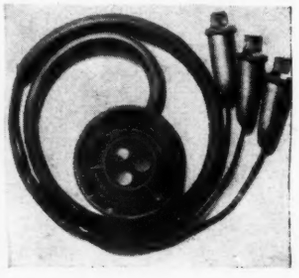


are applicable for underground construction and for installations where moisture prevails.

Delta-Star Electric Company, 2400 Fulton St., Chicago, Ill. Dec. 31, page 1051.

Phase Sequence Indicator

Not infrequently reverse phase is the result of a line change or of disconnecting a line



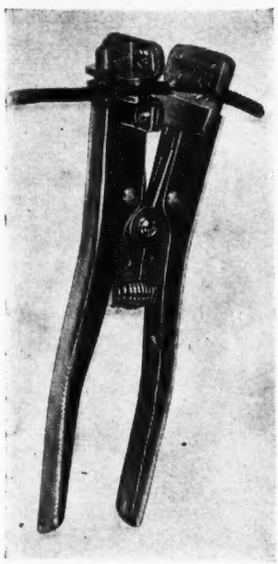
for repairs and connecting it back into the system again. This sequence indicator, known as the Knapp, is designed to provide a device that can be conveniently taken on the job by workmen to check phase sequence rotation and prevent trouble due to a reverse phase.

It is 3¼ in. in diameter x 1 in. thick, is easy to apply and can be suspended from the circuit by its three leads, which are 3 ft. long. The instrument has a voltage range of 50 to 500 and is provided with a push button to connect and disconnect the indicator from the line being tested.

Electrical Facilities, Inc., 3712 San Pablo Ave., Oakland, Calif. April 23, page 679.

Stripper for Solid or Stranded Wire

Designed to protect the operator's hands as well as the wire, the stripper illustrated clamps, cuts and strips automatically with one squeeze of the handle. Cutting edges are shielded, and the blind centers of the notches

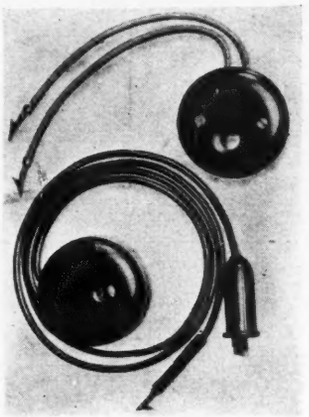


on the blades prevent cutting or scarring the wire. A standard model strips from Nos. 10 to 20 gage solid core or stranded.

Ideal Commutator Dresser Company, Sycamore, Ill. October 15, page 611.

Watch-Case Size Fuse Tester

Designed to eliminate hazards and uncertainties connected with usual methods of locating blown fuses, dead sockets, short circuits and grounds, the Johnson fuse tester shown consists of a resistor coil and other parts inclosed in a heat resistant and non-conducting circular case 2¼x1 in. in size. A 6.2-volt indicating lamp burns dimly at 100 volts and brightly at 250



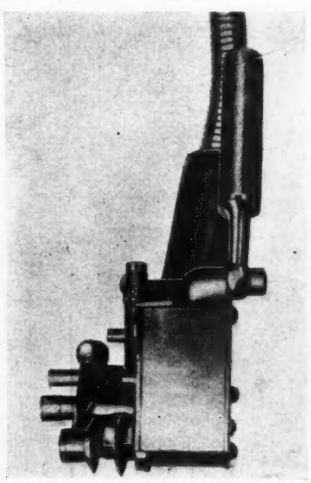
volts. There are no movable parts. The tester may be had with stiff 6-in. leads for general use, or with 18-in. flexible leads with an insulated clasp.

Electric Tester Manufacturing Company, 346 Sherlock Building, Portland, Ore. Feb. 5, page 245.

Improved Mica Undercutter

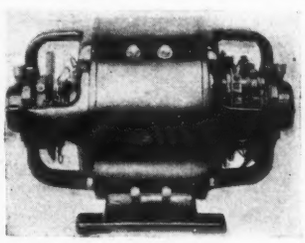
This commutator mica undercutter can be operated in a space 3½ in. wide, or, in most cases, without dismantling brushes, brush boxes or brush rigging. A set-screw locks an adjustable-depth gage and a micrometer adjusting screw is provided for raising and lowering it. A micrometer adjusting screw is also used to set the roller guide the proper distance from the cutter. Distance between cutter and roller can be adjusted to the width of an average small copper bar, thus permitting the guide to be used on the second slot after cutting the first slot by hand. The depth gage is made with a wide surface so that it will not mar the commutator. An extra swivel handle is provided for convenience in holding. This handle can be set at any position. Power is provided through a flexible shaft.

Ideal Commutator Dresser Company, Sycamore, Ill. March 5, page 405.



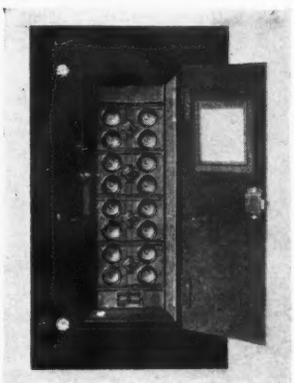
Converter for Electric Signs

When direct current only is available it is necessary to use a machine to convert the direct current into alternating for use with Neon gas signs. The inverted rotary converter shown has been made available for this purpose. Either two-wire single-phase or four-wire two-phase machines may be had. The two-wire machines are designed to convert 115- or 230-volt direct current into single-phase 110-volt 60-cycle alternating current. The four-wire



machines convert 230-volt direct current into 110-volt 60-cycle two-phase alternating current. Continuous ratings for the single-phase machines range from 0.3 to 2.5 kva. and for the two-phase designs from 2.5 to 12.6 kilovolt-amperes.

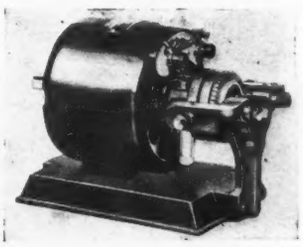
Roth Brothers & Company, 1400 West Adams St., Chicago, Ill. March 12, page 447.



Narrow Lighting Panelboards

These narrow lighting panelboards are only 12 in. wide overall (6-in. panel and 3-in. gutter all around), which allows them to be used where the larger boards could not be installed owing to space limitations. They are built in capacities up to 100 amp., with all copper busbars of standard size. They can be supplied with cartridge as well as plug fuses, and switched circuits as well as fused can be furnished in the branches. Where both switches and fuses are supplied, the switches are of the tumbler type of 30-amp., 250-volt rating.

Square D Company, Detroit, Mich. Sept. 17, page 459.



Motor-Driven Polarity Changer

In this motor-driven contact maker for converting direct current to alternating current, direct current is fed to the commutator through a pair of slip rings and the output is taken from brushes in contact with the commutator. The motor can be wound for any alternating-current or direct-current voltage, and has no electrical connection with the slip rings or commutator. For certain work the commutator is designed to give an alternating current of 360 cycles per second, or higher if necessary. The same equipment can be used for selective frequency ringing or for any purpose requiring an alternating current. The units are made in capacities of 100 watts or higher.

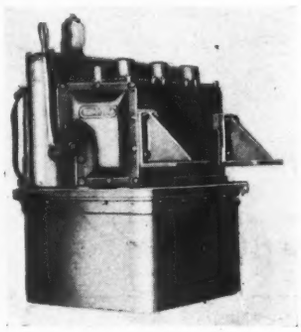
Bodine Electric Company, 2254 West Ohio Street, Chicago, Ill. Dec. 17, page 978.

Oil Circuit Breaker for Underground Service

In this oil circuit breaker (designated type M-210) for underground distribution service a light, rapidly accelerating mechanism is used to give high-speed characteristics and easy operation. Individual tanks per pole are provided, of welded steel plate. There is space in the upper part of the frame for two bushing-type current transformers per pole, with which trip coils are used.

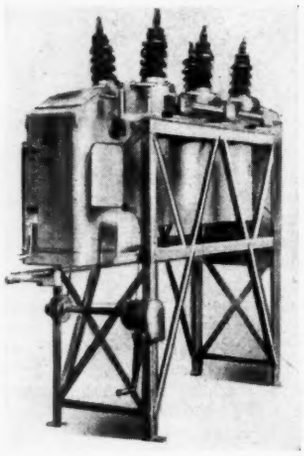
The breaker illustrated is furnished manually operated, three-pole, single-throw for 400 amp. at 15,000 volts, non-automatic or full automatic, with an estimated interrupting capacity of 60,000 kilovolt-amperes.

Condit Electrical Manufacturing Corporation, Boston, Mass. Sept. 17, page 459.



Circuit Breaker of High Interrupting Capacity

Two additional sizes, JC-22 for 25,000 volts and JC-26 for 37,000 volts, each having an interrupting capacity of 125,000



kva., constitute a recent addition to the standard line of breakers put out by the same company. These new breakers have one cast top member for all three phases, with individual tanks per phase; all operating parts fastened to the one-piece cover; rotary-type break, high operating speed and end or side mounting of control.

The control furnished with the breakers is of the motor-wound spring actuated type.

Pacific Electric Manufacturing Corporation, 2515 3d St., San Francisco, Calif. Nov. 12, page 770.

Electric Strip Heater

Suitable for use either as an air heater or as a "clamp-on" device, this strip heater is 24 in.

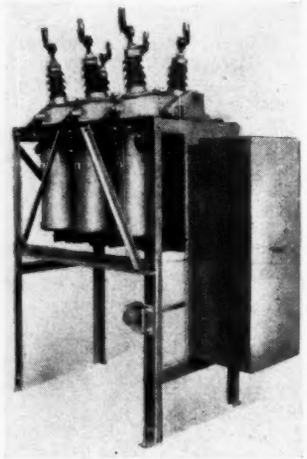
long, 1½ in. wide, ⅜ in. thick and is rated 500 watts at 110 or 220 volts. Slots are provided in each end, allowing the heater to be supported in the air or clamped to a metal surface.

Both terminals are at one end of the unit and project from the same side. The current-carrying resistance wire inside the sheath is the usual nickel-chromium resistor wound in a helix. The coil is supported at each end by a porcelain insulator and is stretched down the length of the unit four times.

General Electric Company. Feb. 26, page 365.

Moderate-Capacity Oil Circuit Breaker

Designed for use on distribution services at 15,000, 25,000 and 37,000 volts in capacities of 400, 600 and 800 amp., this breaker has heavy laminated brushes protected on closing and opening by unusually large arcing contacts. One-piece porcelain bushings extend below the

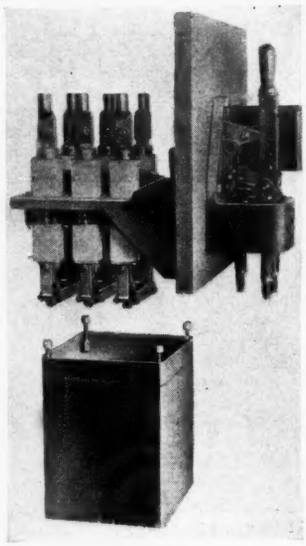


oil line and are securely clamped to the top. Provision is made for two-bushing current transformers per pole, and series-type current transformers can be mounted inside of the breaker tank if desired. The breakers are manually or electrically operated.

Condit Electrical Manufacturing Corporation, Boston, Mass. Aug. 20, page 299.

Improved Oil Switches and Circuit Breakers

Known as type O, these breakers range in capacity from 200 to 2,000 amp., from 2,500 to 15,000 volts, and have interrupting capacities from 20,000 to 40,000 kva. They are made in two-pole and three-pole models, automatic and non-automatic, single- and double-throw, with various mountings. Remote control, electrical or hand operation, and special designs to meet



exceptional requirements can be supplied.

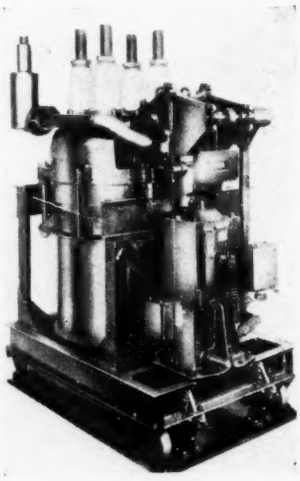
Laminated copper leads extend from the terminals through the porcelain insulators and are clamped at the bottom to form inverted brushes. The moving bridging member is relatively light, thus giving high opening speed. It is self-aligning, and adjustable on the contact rod to secure proper contact. Oil throw is eliminated by the use of an internal operating mechanism.

Roller-Smith Company, 233 Broadway, New York City. July 23, page 143.

Track-Type Oil Circuit Breaker

In this breaker the contact system, studs, bushings and mechanism are supported by a dome-shaped, cast-steel top, which in turn is supported by a channel structure on wheels.

To afford the necessary current capacity without undue

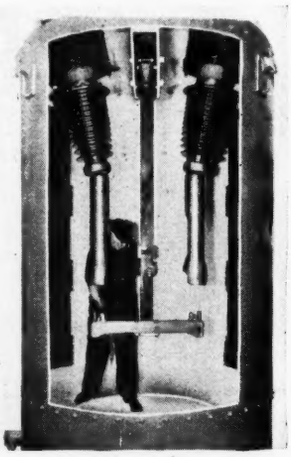


heating, four studs to each pole unit are used, each with a capacity of 2,000 amp. Inside the breaker these studs are clamped in a pair of heavy contact blocks, two studs to each block. Design of the arcing contact circuit makes use of the electromagnetic forces developed on high current rushes to insure the arcing contacts remaining closed until the brushes have safely parted. The breaker has an estimated interrupting capacity of 1,000,000 kva. at 15,000 volts.

Condit Electrical Manufacturing Corporation, Boston, Mass. July 16, page 105.

Wood-Base Micarta Breaker Lift Rods

In making the wood-base micarta lift rods now available for use on large high-voltage breakers a veneer stock which can be carefully inspected is coated in micarta and piled up, and pressed into a board of suit-



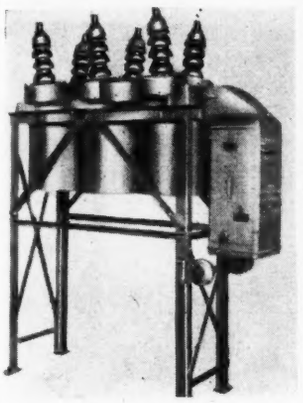
able thickness and length, which gives a uniform laminated structure by applying heavy pressure and heat during formation of the plank. The result is a material of uniform mechanical and dielectric strength; and use of a laminated structure avoids possibility of a cross-grain. Mechanical strength of wood-base micarta is much greater than wood, its dielectric strength is as good as paper-base micarta, and it is not in any way affected by moisture or oil.

Westinghouse Electric & Manufacturing Company. June 18, page 1016.

Oil Circuit Breaker Has Motor-Operated Control

This type JC-17 oil circuit breaker incorporates high rupturing capacity with small physical dimensions. It is designed on the rotary-break principle, the rotating member being a heavy blade with arcing tips insulated by a Bakelite tube having wide puncture and creepage margins.

Individual tanks for each phase are bolted to the top, and this form of construction permits shipping the breaker as an

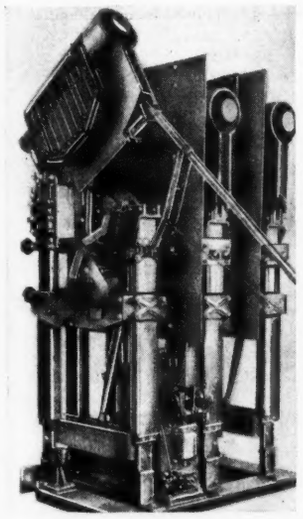


assembled and tested unit. Control is of the motor-wound, spring-actuated type, giving high blade speed and positive locking without rebound.

Pacific Electric Manufacturing Corporation, San Francisco, Calif. April 9, page 601.

Breaker Operates on New Principle

No oil, low maintenance, ease of inspection, and ability to interrupt heavy alternating-current power in air quicker than a comparable oil circuit breaker, are features of the new Deion circuit breaker. As in an ordinary air breaker, a long arc forms at the arcing terminals as the contacts open. A magnetic field, produced by the line current flowing through a few series turns, blows the arc upward



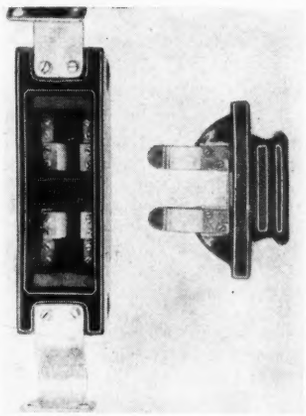
into the deionizing chamber. The chamber consists of a number of thin metal plates spaced $\frac{1}{16}$ in. apart and located at the top of the breaker. The long arc on entering this chamber is broken into a multiplicity of short arcs, which are caused by a magnetizing field to rotate and are extinguished. Quick extinction of the arc in the breaker clears a fault with minimum disturbance to the system.

Westinghouse Electric & Manufacturing Company. March 26, page 520.

Cut-Out for Series Lighting Circuits

Consisting of two parts—a plug assembly with film, and a receptacle assembly, this cut-out is designed to afford an easy and safe means of totally disconnecting lamp circuits and high-tension underground systems. When the plug is removed from the receptacle, both the line and lamp circuit are independently short circuited and are insulated from each other.

Both the plug and receptacle are made of wet-process porcelain, with a barrier between the lamp and line circuit providing a long leakage path. The unit

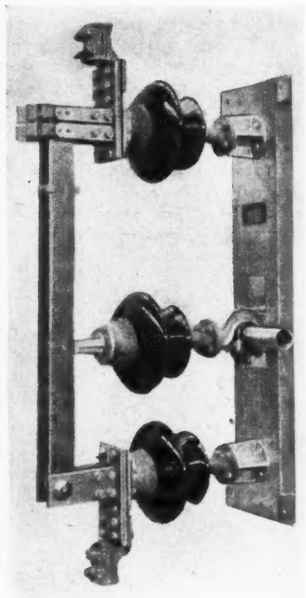


is designed to withstand a dry flashover test of 40,000 volts. Conductor and contact surfaces are nickel-plated.

Westinghouse Electric & Manufacturing Company. Feb. 26, page 365.

Gang-Operated Multi-Pole Switch

The pivoted center insulator of this switch pushes the blade out of and draws it into floating contacts by means of an interconnected operating mecha-



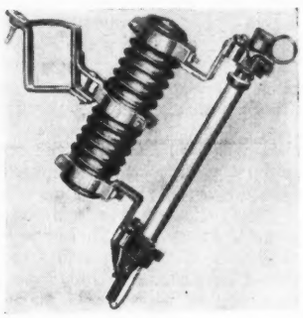
nism controlled by a common handle. The operating mechanism is so arranged that the center insulator unit is in toggle in both full-open and closed positions. The terminal lugs are of the heavy-duty clamp type. This switch is made for a large range of voltage and ampere capacities, the one illustrated being rated at 15 kilovolts and 1,600 amperes.

Delta-Star Electric Company, 2400 Fulton St., Chicago, Ill. Jan. 7, 1930, page 37.

Line Fuse Switches

These new one-piece porcelain switches are designed so that any switch can be used either as a fuse or disconnect by interchanging the blade or cartridge. The one-piece porcelain used is fog type, having exceptionally high wet and dry flashover.

Resilient inserts between the porcelain and metal rings eliminate spot loading on the porcelain. The switches are supplied with standard stamped contacts having special spring clips to give additional contact pressure, or full floating self-aligning standard contacts, or ferrule contacts. The line includes 7,500-12,000 and 15,000-volt line fuse switches, disconnect switches,



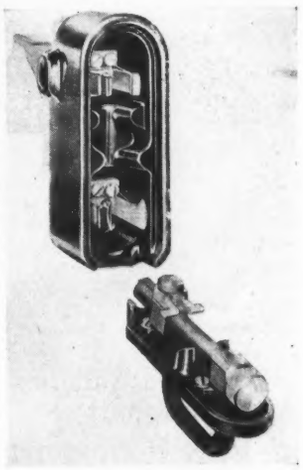
and fuse-switch-choke-coil combination switching equipment.

James R. Kearney Corporation, St. Louis, Mo. April 9, page 601.

Cleaning and Lubricating Liquid for Commutator and Slip Rings

A cleansing and lubricating liquid known as Cramolin, for use on commutators, slip rings and similar rubbing surfaces which conduct electric current, is claimed to loosen automatically and remove dirt or foreign substance causing resistance between commutators or slip rings and the brushes. It can also be used to supply a thin lubricating film on rubbing parts that are difficult of access, as it is claimed to be non-resinous and non-crusting.

Cramolin, Inc., 25 West 43d St., New York City. March 12, page 445.



Box Fuse for Small-Capacity Circuits

The housing of this 2,300-volt 30-amp. fuse is of high-grade wet-process porcelain with a flashover valve between terminals and hanger of 28,000 volts dry and 14,000 volts wet. Contact clips are double phosphor bronze. The cartridge's lower terminal is provided with lugs which fit over projections on the lower contact clips and which serve as a hinge for the door. Over-all width of the fuse is 3 in., height 6 inches.

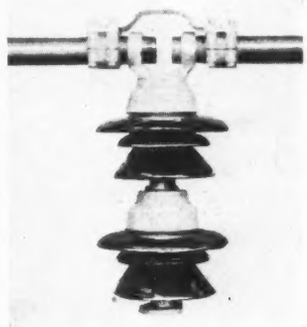
Line Material Company, South Milwaukee, Wis. Dec. 10, page 940.

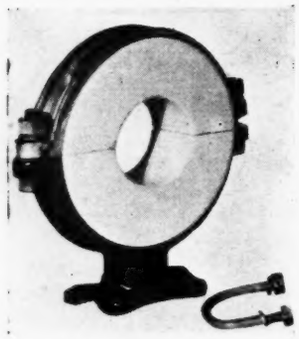
Expansion Joint for Aluminum Tube Bus

To the cap of the standard insulator is bolted an aluminum alloy saddle with two projections, the interior surfaces of which are cone-shaped. A tubular bus resting on these rounded surfaces is free to move, and there is no binding due to conductor sags. This form of expansion joint is especially adapted for long sections of heavy aluminum tube bus.

To each section of the bus is clamped a sheaf of thin flexible aluminum strips, which permit moving of the tubes as they expand or contract. All the bolts and nuts are made of duralumin.

Delta-Star Electric Company, 2400 Fulton St., Chicago, Ill. Nov. 19, page 807.





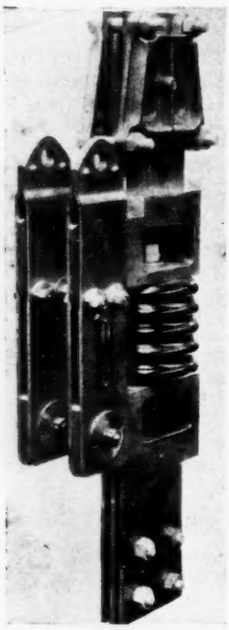
Clamp Insulator Support

In this line of clamp insulator cable supports for either flat or pipe mounting by means of U-bolts, the white glaze porcelains are interchangeable, supporting bases are malleable iron, and top clamps are of alloy metal. Mechanical strength is high, and the porcelain is designed for installations of wide temperature variations.

Champion Switch Company, Kenova, W. Va. Nov. 19, page 806.

Double-Blade Tongue-Type Disconnecting Switch

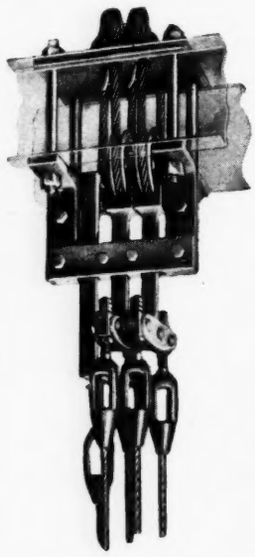
Designed for clamping directly on busbars, this double-blade tongue-type disconnecting switch affords a convenient method of inserting a disconnector between the oil switch and bus. The switch assembly forms a compact unit, with a clamp at the top to secure upper contact of the switch to the busbar and a suitable extension on the lower contact for connection to the oil switch.



Delta-Star Electric Company, 2400 Fulton St., Chicago, Ill. Oct. 1, page 534.

Equalizer for Elevator-Compensating Ropes

This compensating rope equalizer for traction elevators is a modified form of the well-known Evans equalizer for hoisting ropes. It is designed to be attached to the safety plank under the car. Where there are five ropes four of them are grouped in pairs attached to the ends of the equalizing bars, the bars being attached to sheaves. An equalizing rope runs through the sheaves and sheaves in the stationary part of the equipment. One end of the equalizing rope is made fast in the stationary element, and the other end is attached to the fifth rope through a safety bar. Any variation in rope travel around the compensating sheave due to unequal groove tread diameter is adjusted in the equalizer.



In the six-rope type of equalizer a third equalizer bar and sheave is added for the third pair of ropes. In very tall buildings the equalizer bars are replaced by sheaves and the compensating ropes are connected to a short piece of rope around the sheaves. This arrangement allows for a larger amount of adjustment of difference in the rope's travel than can be taken care of with the equalizing bars.

Evans Elevator Equalizer Company, Chanin Building, New York City. Dec. 10, page 942.

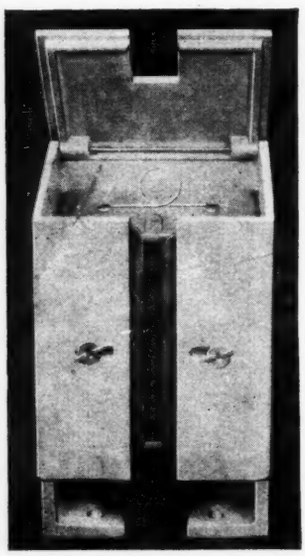
Elevator Guide-Rail Lubricator

An automatic guide-rail lubricator designed to use a light grease as the rail lubricant and for mounting on the upper end of the top guide shoes on the car and counterweights is illustrated. Grease is packed around the guide rails and is applied to them by movement of the car and the counterweights. Each lubricator holds about 2 lb. of grease.

The lubricator consists of an oil chamber designed to fit onto the guide rail and bring the lubricant in contact with the three working faces of the rail. There is a felt pad at the bottom of the grease reservoir that acts as a packing to keep the grease in the reservoir and also prevents an excess from getting on the guide rail.

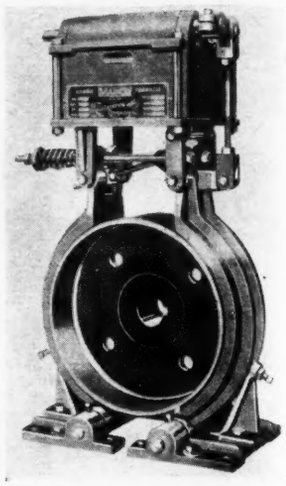
The device is adapted to either slow-speed or high-speed elevators, being in use on cars operating at speeds as high as 750 ft. per minute.

Yvan Zenon, 244-22 136th Ave., Rosedale, N. Y. Sept. 3, page 385.



Alternating-Current Elevator Brake

In this new alternating-current brake the operating mechanism is located above the brake shoes, where it is readily accessible. This arrangement does not require a base for the brake and allows it to be installed where the brake wheel is near the machine's bedplate. For extra quiet operation the brake magnet is immersed in an oil reservoir. The magnet core is built up of high-grade laminated silicon steel and is three-legged in form, with a coil on each of the outside legs. The two magnet coils may be connected for ingle-phase, two-phase or three-phase operation. Brakes may be obtained with or without the oil reservoir to operate on any of the standard voltages and frequencies and for any capacity elevator.



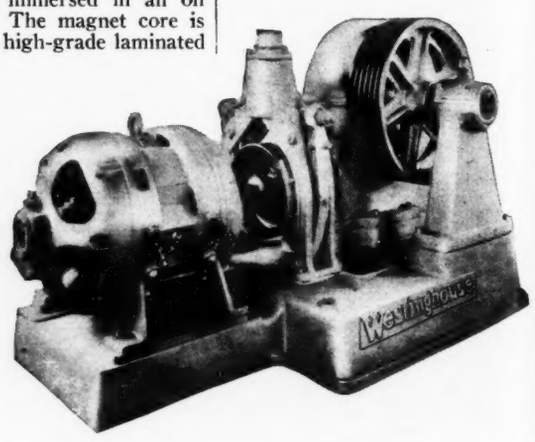
The Maintenance Company, 449 West 42d St., New York City. July 30, page 188.

Direct-Current Control Used on A.-C. Elevators

To get rid of the noise of alternating-current elevator brakes and control magnets a copper-oxide rectifier, or Rectox, to supply direct current for these purposes is used with this elevator machine. The rectifier makes possible the combined advantages of direct-current auxiliaries and the simple alternating-current geared elevator.

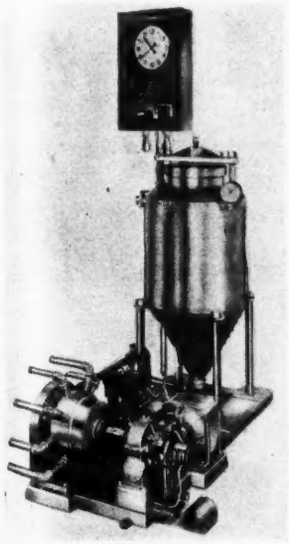
Rectox is an electronic and not an electrolytic device. It is silent and of substantial construction and may be applied without complicating the control.

Westinghouse Electric & Manufacturing Company. April 23, page 681.



Completely Automatic Lubricating System

This lubricating system, which is designated Pneuma-Lectric, provides complete automatic lubrication with practically no attention except occasional filling of the grease tank. It is readily adaptable to practically all types of machines, and intermittent feed is adjustable to the requirements of the unit being



served. It is possible to vary the time at which the grease is fed from once in five minutes to once in 24 hours.

An air compressor is regulated to maintain the pressure in the tank above the grease between the limits of 170 and 210 lb. Discharge is from the bottom of the tank to the rotary distributor, which is driven by a motor through a worm-gear reduction unit. Operation of the motor driving the distributor is controlled by the electric clock, which may be set to any predetermined period of time. The motor operates the distributor, and a charge of grease is supplied to each bearing consecutively, the motor continuing to run for about 12 seconds until the clock breaks the contact.

The rotary distributor is made in two sizes, No. 2 with a 2-in. rotor and No. 8 with an 8-in. diameter rotor. (Intermediate sizes are made to meet certain requirements.) No. 2 size is made with 8 outlets of ½-in. pipe tap, and No. 8 size has 8 outlets of 1-in. pipe tap. The rotor of the distributor is made hollow, with one master port for each line of 8 outlets. Although the various parts of the units are shown grouped in the illustration, their location can be varied to meet the needs of the installation.

Keystone Lubricating Company, Philadelphia, Pa. Oct. 29, page 691.

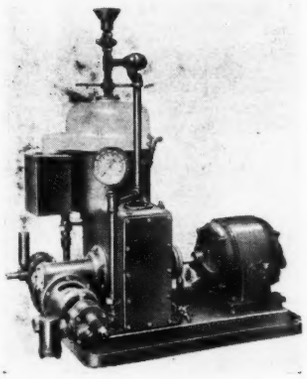
Oil Lubricating Systems, Filters and Purifiers

Complete automatic lubricating system controlled by a time clock, process for maintaining quality of turbine oil through bringing it in contact with condensate which absorbs the oxy-hydrocarbons, and new non-aërating purifiers are described in this section.

Non-Aerating Oil Purifier

A completely inclosed, vapor-tight, non-aerating machine suitable for handling lubricating, insulating or fuel oils, or any of the volatile oils, is illustrated. It carries so-called wet and dry pumps, with piping arrangements to suit conditions. The purifier may be equipped with a heater of the electric-immersion type, or it may be provided with a filter attachment consisting of a suitable number of sheets of filtering medium to remove the carbon and coloring matter.

Some of the special features



of bowl construction are heavy base to stabilize the bowl and prevent vibration from any unbalanced condition of the water or oil entering or leaving the bowl, taper fit on the spindle, and the double-spindle bearings. To permit ease of cleaning the bowl shell is without ridges or projections, the bowl is divided at the bottom of the shell, and the separating disks may be removed as a unit or they may be revolved on the spindle after the shell has been removed, in this way utilizing centrifugal force to clean the base and the disks of any matter that adheres to them. The capacity of the purifier ranges from 300 to 500 gal. per hour, depending upon the gravity or quality of the oil.

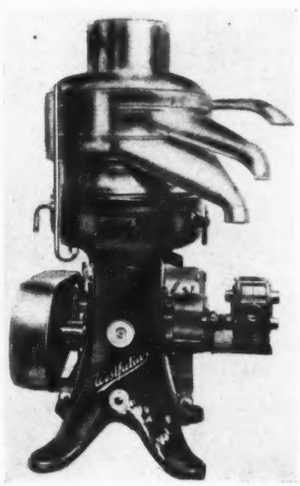
Hydroil Corporation, Lebanon, Ind. Dec. 3, page 900.

High-Speed Centrifugal Purifier

One of the distinguishing features of this purifier is the purifying efficiency of the high-speed centrifugal disk set in common use with oils in which the specific gravities of the oil and the impurities do not differ greatly. Dividing the entire quantity of oil in the machine into a large number of films beween the disks facilitates taking out heavier-than-oil particles.

To obviate troubles often encountered with oils where the differences in the specific gravity between the oil itself and the impurities are rather great, a so-called wing set has been developed that will care for large transformers, turbines and Diesel engines now in service. Where flow of liquid by its own gravity to or from the purifier is not possible, either one or two pumps may be attached. The machine is equipped with ball bearings and an automatic lubricating system. On the front of the machine is a tachometer to indicate the speed, an important factor in obtaining best results with a machine of this type on the various grades of oils handled.

Westfalia Separator Company, 110 North Franklin St., Chicago, Ill. Oct. 8, page 571.

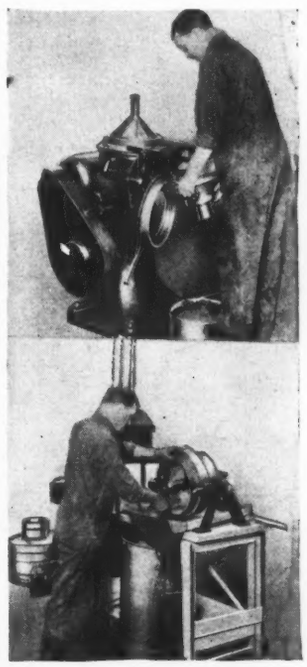


Tools Facilitate Cleaning of Purifier Bowl

Although no special tools other than the wrenches, etc., regularly supplied with the machine are necessary to clean the bowl of the Nos. 600 and 900 De Laval oil purifier, others are available which facilitate work and safeguard parts from injury.

Accessory equipment for No. 500 machine consists of a welded iron frame shaped to hold all bowl parts as they are removed from the machine. The top of the bowl is placed across the two lower arms of the hanger, while the bowl shell is laid across the two upper arms in a convenient position for cleaning.

A tilting bowl vise is furnished for No. 900 purifier. This vise is equipped with a spindle,



similar to that in the purifier, on which the bowl is placed for cleaning, and is constructed so that the bowl may be tilted or rotated at will. A special ratchet-type lever on the vise is used for loosening and tightening the bowl's coupling ring. A pan holds the disks, and another, directly under the vise, receives water and dirt from the bowl and discharges it to a container.

De Laval Separator Company, 165 Broadway, New York City. Sept. 24, page 497.

Threadless Oil-Hole Fittings

To simplify installation of standard high-pressure lubrication fittings on the regular open-type of bearing a line of fittings that are simply driven into place in the bearing have been developed.

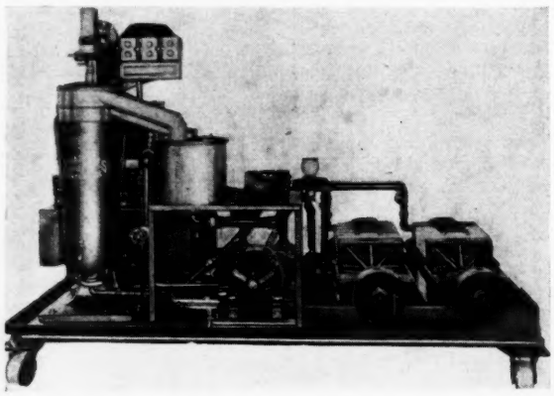
A reverse feather-edge bushing of the correct size is first driven into the open oil hole with a hammer and a driving tool, no extra drilling or threading being necessary. The bushings are made in sizes from $\frac{1}{8}$ to $\frac{1}{2}$ in., varying by sixty-fourths. Special bushings are made for countersunk holes and for thin housings. A nipple with dirt-proof check is installed in the top of the bushing.

An ordinary hammer and a set of three special drive tools form complete equipment for installing the fittings.

Alemite Manufacturing Company, Chicago, Ill. Feb. 12, page 284.

Large-Capacity Oil Purifier

In this unit a Sharples supercentrifuge is combined with a Westinghouse filter press equipment and mounted on a truck. Capacity of the machine is 1,000 gal. per hour continuously.



Piping is so arranged that oil can be run through the centrifuge only and discharged without passing it through the presses. Electric heaters for raising the temperature of the oil to the proper point, and push-button type starters for controlling the operation of the purifier and pump motors are incorporated in the machine. The floor space required is approximately 54x106 inches.

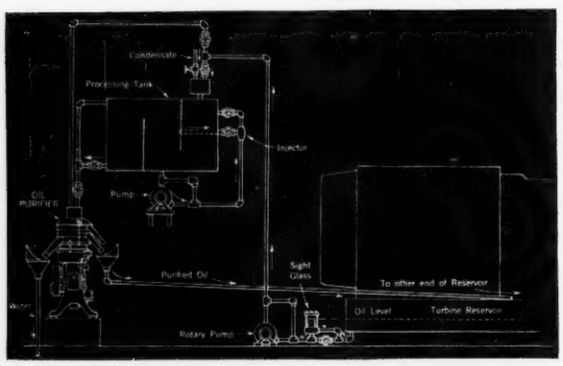
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Dec. 17, page 977.

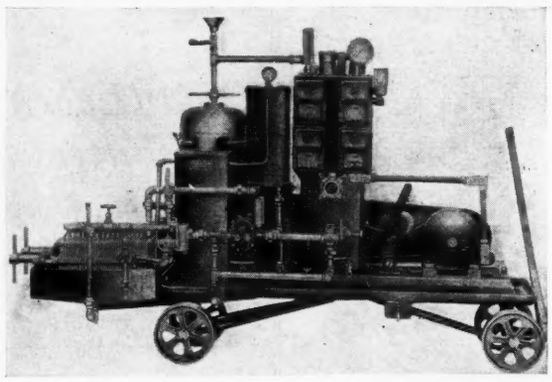
Process for Maintaining Quality of Turbine Oils

A new process for maintaining the efficiency of turbine lubricating oil, known as the De Laval-Funk process, prevents formation of sludge within the turbine-lubricating system by a method in which a portion of the oil in circulation is continuously brough into contact with condensate under conditions more favorable to the formation of sludge and the absorption by the condensate of oxy-hydrocarbons than those which exist in the turbine itself.

Oil is continuously withdrawn from the bottom of the turbine reservoir, either by a pump or by gravity flow and passed to the processing tank, into which a small stream of condensate enters at the same point. The incoming mixture of oil and condensate is brought into intimate contact by means of baffles, agitator pump and mixing nozzle. The mixture of oil and water gradually finds its way to the top of the last baffle, from which it overflows to the purifier. The purifier can be installed above, below or on the same level as the turbine.

De Laval Separator Company, New York City. Dec. 3 page 901.





Non-Aerating Oil Purifier

Completely inclosed, non-aerating and fully automatic are features of this model F-50 purifier. It has a capacity of 500 gal. an hour, and dimensions are: length, 90 in.; width, 45 in.; height, 67 in. Flow of oil to the bowl is measured and controlled by a modified Venturi meter working in conjunction with a pressure-regulating valve. There is restriction or orifice in the delivery pipe leading from the heater casing to the bowl, and the flow of oil is controlled by varying the pressure ahead of this orifice.

Three 8-kw. immersion-type heaters that can be manually operated by standard quick-break switches or controlled by means of double-pole contactors working on a standard push-button control, are furnished to maintain the oil at the proper temperature. Operation of the contactors is either manual, by a push-button control, or automatic, by a suitable adjustable thermostat. The thermostat is adjustable and can be set for any range from 100 to 140 deg., each heater cutting out on a range of 5 deg. above or below the next heater in service.

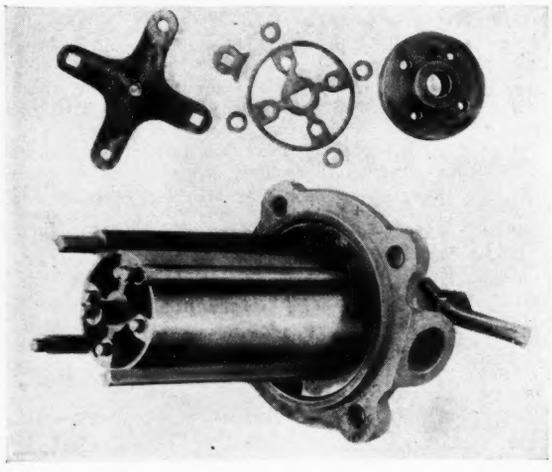
Hydroil Corporation, Lebanon, Ind. May 14, page 797.

Filter With Self-Cleaning Feature

Designated the "Auto-Klean," this multiple-disk filter is adaptable to a variety of liquids, but particularly suitable to oil filtration in Diesel engines. Models ranging in size from gasoline filters 4 in. high to multiple units capable of passing 125,000 gal. an hour are available.

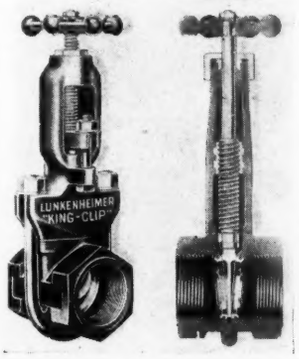
The filtering cartridge is built up of a stack of thin perforated disks, each separated by a thin metal spacer. Liquid enters on the outside and passes through the spaces between the disks, the impurities being caught at the outer edge of the disks. There is a small stationary cleaning blade between each disk, and the filter is cleaned by turning the cartridge on its axis, causing the blades to sweep the edges of the disks free of solid matter, which drops to the bottom chamber to be removed at intervals.

Cuno Engineering Company, Meriden, Conn. Sept. 10, page 419.



Piping, Valves and Fittings

Self-grinding, self-cleaning gate, hydraulic and solenoid-operated valves, boiler blowdown valves for 1,400-lb. pressure, a valve operator that limits the torque on the stem in either direction, and various tools and packings are included.



Gate Valves in Screw and Quick-Operating Types

Three designs, rising-stem inside-screw, outside-screw-and yoke and quick-operating, are included in this line of gate valves (designated the "King-Clip") for use on steam, oil, gas, air, water and gasoline lines. All types are available in iron-body bronze-mounted and all-iron patterns, with screw or flanged ends. In each type the bonnet is secured to the body by a steel U-clip. The disk is sharply tapered, making the valve also adaptable for handling heavily impregnated fluids.

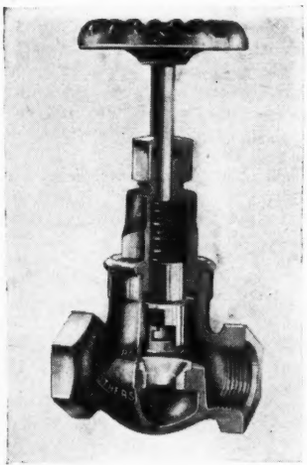
In the all-iron patterns, all parts except the bronze bushing in outside screw-and-yoke valves are made of ferrous metals. Sizes up to 2-in. have permanently rolled-in steel seat rings; larger sizes have integral seats. Pressure ratings are: Screw ends ¼ to 2 in. (inclusive), 150 lb. working steam pressure, 225 lb. gas or liquid pressure; screw ends 2½ to 4 in. (inclusive), and flanged ends 1½ to 4 in. (inclusive), 125 lb. working steam pressure, 175 lb. gas or liquid pressure.

Lunkenheimer Company, Cincinnati, Ohio. June 11, page 979.

Self-Grinding Globe and Angle Valves

The use of a spring and stem bushing inside the standard bonnet, the bushing instead of the bonnet carrying threads for the stem, characterize this line of self-grinding globe and angle valves. The bushing moves up and down through a limited travel when the stem is screwed in or out, and after the disk comes in contact with the seat it is permitted to rotate for one complete turn of the wheel handle, creating in this way a grinding action every time the valve is opened or closed. The lower limit of travel of the bushing is regulated by a small shelf cast in the body of the valve, which comes in contact with the deep notch in the bushing.

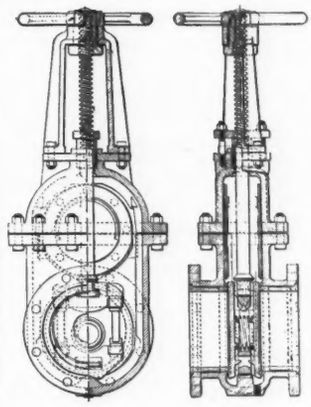
When the valve is being closed the bushing moves down to its lower limit, and as the seat and disk make contact the bushing starts to rise against the compression of the spring and continues its upper movement until it comes in contact



with the lower lip of the bonnet and assumes a locked position to give a metal-to-metal contact, eliminating spring action.

These valves are made in sizes from ¼ to 2 in. in diameter, and for two pressures, 150 and 300 lb. The material used is steam metal bronze, while the renewable seats are of Monel metal.

Kelly Valve Company, 372 W. Grand Ave., Chicago, Ill. April 30, page 718.



Self-Cleaning Gate Valve

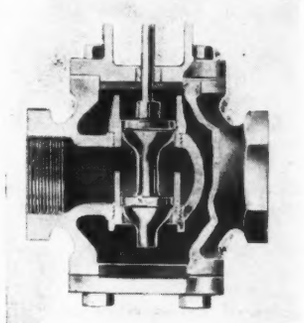
Wedges top and bottom to give a four-point contact on each disk so as to distribute the pressure uniformly over the surface of each disk are used on this improved line of Kelly valves. The upper wedge is attached to the stem, while the lower wedge is secured between two disks and as the valve is closed comes in contact with a hump at the bottom of the body, which serves the double purpose of centering the lower wedge and also of reinforcing the bottom of the body against the blow of the wedge striking it as the valve is closed.

On the 8-, 10- and 12-in. sizes the flanges are cast integral with the body instead of being screwed, as had been done in sizes 6 in. in diameter and smaller. The joint of the thimble with the flange is covered by a gasket to prevent leakage past the seat inserts. Inserts and the disks can be faced with any material desired. The valves are designed for steam pressures of 125, 200 and 300 lb. and will be furnished in cast steel for the higher pressures.

Kelly Company, 372 W. Grand Ave., Chicago, Ill. May 7, page 759.

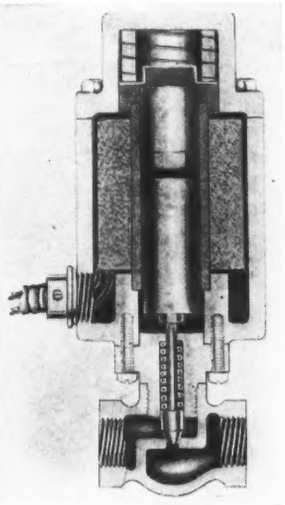
Valve Gives Graduated Flow Over Full Range

Designed to give graduated port opening and graduated flow throughout its full capacity range, the "Parabolic" valve illustrated is adaptable for use in back-pressure or pressure-reducing regulators, in diaphragm or motor valves and in conjunction with other devices, such as temperature and flow controllers. The flow distributes evenly around the valve plug and there is no tendency for the valve to be forced against one side of the ports by the line pressure.



These valves are normally furnished with cast-iron bodies, seats and valve plugs and stainless-steel stems. They can also be furnished with stainless steel, Monel metal or bronze seats and valve plugs. Also with aluminum or other alloy working parts. They are made in sizes from ½ to 10 in. and for pressures up to 400 lb. at 750 deg. temperature.

Neilan, Schumacher & Company, 641-651 Santa Fe Ave., Los Angeles, Calif. Aug. 13, page 263.



Packless-Type Solenoid Valves for Various Service

Made in four models and designed for use on oil, water, gas, brine and air, this line of solenoid-operated valves includes: Type N, with needle valve in sizes from ¼ to ½ in., especially designed to control the feed supply to oil-burning equipment, water supply on refrigerating machines and similar services; type D, in sizes ¼ to 3 in., with globe valve of removable disk type; type SB, with semi-balanced valve, in sizes from ½ to 3 in.; and type P, with piston valve, in pipe sizes from 1 to 3 in. Absence of a stuffing box on the valve spindle and use of a sealed sleeve to protect the magnet coil are important features.

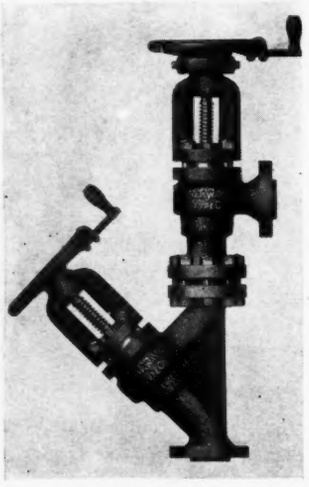
The movement is so constructed that a rust-proof steel plunger which is directly connected to the stem of the valve is free to slide in an airtight housing of special composition. This housing is sealed at the

bottom by a gasket and at the top by a steel cap which is forced down by a compression spring. The spring allows for expansion of the cast-iron housing under operating conditions and for conduction of heat from the valve body. The valve is actuated for remote control by a push button, or automatically by a two-wire thermostat pressure regulator or float switch. When it is desired to have the valves operated automatically a suitable relay is interposed between the control device and the solenoid valve.

Electric Valve Manufacturing Company, 68 Murray St., New York. May 21, page 839.

Blowdown Valves for Pressures up to 1,400 Pounds

The illustration shows a tandem arrangement of blowoff valves now available for pressures up to 1,400 lb. The valves are identical, the only differences in the two being the shape of the body. In the design of the lower valve the spindle is placed at a 45-deg. angle to facilitate operation. In the latest design the one-piece plunger

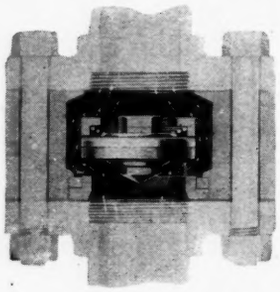


is extended to permit placing the lower ring of packing low down in the body, and the planetary gear train, which is used with the larger valves on the high pressures, has been changed to include two sets of duplicate pinions in place of one, as formerly used. The gear train serves to give a three-to-one ratio in the drive between the handwheel and valve spindle.

Yarnall-Waring Company, Philadelphia, Pa. May 14, page 796.

Noiseless Check Valve

A distanct advantage of this floating check valve designed to operate noiselessly in any position for pressures up to 1,000-lb. is the fact that it occupies only 2½ to 4½ in. in the



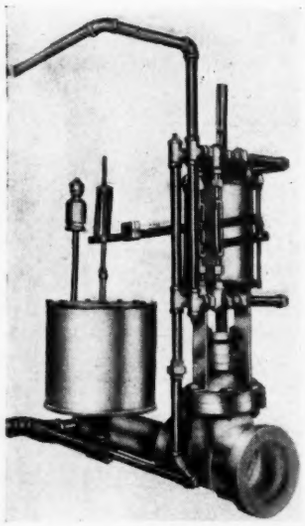
line, for pipe sizes ranging from 1 to 6 in. diameter. Being built of metal to suit the service, it is applicable to use in vacuum heating systems, boiler-feed lines, house supply lines, air compressor lines, oil, gasoline and chemical lines. The heavy cylindrical body is of cast iron or steel, and the trim of government bronze or of nitralloy for higher temperatures and pressures. The valve mechanism consists of a three-point guide cage that screws into the body; a self-cleaning valve disk with tapered holder to guide the flow, a renewable seat that also screws into the body, and a beehive spring to hold the valve disk to its seat.

Sizes range from 1 to 6 in., larger valves being made to order.

Williams Gauge Company, 343 South Dearborn St., Chicago. Dec. 17, page 977.

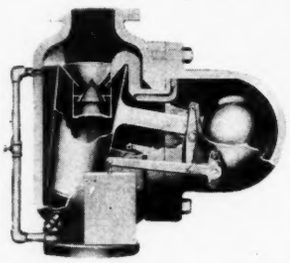
Hydraulically Operated Sewer Back-Up Valve

This hydraulically operated valve has been developed to overcome the hazards from sewer back-up or overflow in



the basement of plants or buildings at the time of heavy storms or maximum flow. In neutral position it is always open and it remains open until a back-up occurs. If back-up water floods the float chamber, it raises the float, which, in turn, operates a series of valves controlling the supply of water to the operating cylinder of the gate valve. In the event of a back-up the valve closes automatically and opens again as soon as the water recedes.

All moving parts of the valve are of bronze, to prevent corrosion. Other parts of the valve



are made of cast iron and steel.

Little Giant Manufacturing Company, 1917 Nicollet Ave., Minneapolis, Minn. June 4, page 942.

Quick-Closing and Water-Stop Throttle Valve

Designed to protect engines, turbines and pumps against damage from slugs of water coming over with the steam, this quick-closing and water-stop throttle valve is placed on the vertical steam line to the unit above the throttle valve. A bucket is held in an upward position against a stop by a counterweight supported on two knife edges. Steam entering the valve is directed into the bucket by baffles. These baffles cause the steam to change its direction, and in this way any entrained water is thrown to the bottom of the bucket. Under normal operation any small amount of condensation is drained from the bucket through two or more holes drilled at the bottom above the valve seat. In the event of a slug of water coming over it overbalances the counterweight and causes the bucket to descend and close the bottom outlet, thus stopping the flow of steam temporarily until the line is drained of condensation. Provision is made in the design of the valve for remote control.

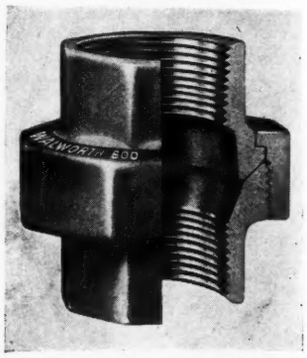
Morton Vacuum Braker Company, Canton, Mass. Nov. 5, page 732.

Forged-Steel Union

The three parts of this forged-steel union, designed especially for high pressures and temperatures, are forged from high-grade steel.

The union is suitable for service with steam or hot oils and vapors, at 600-lb. pressure and 750-deg. total temperature, and, on cold water, oil or gas, at pressures up to 2,000 lb. It is available in standard pipe sizes from ⅛ to 2 inches.

Walworth Company, Boston, Mass. Oct. 29, page 692.

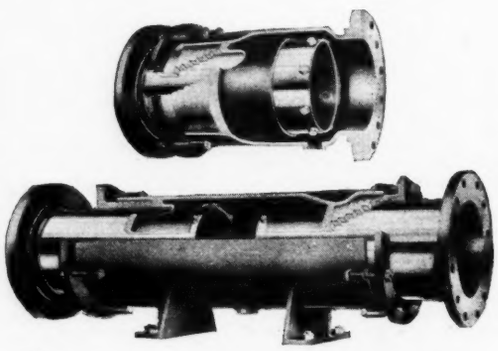


Cylinder-Guided Expansion Joint

A feature of this cylinder-guided expansion joint is a steam-jacketed cylinder guide integral with the body. This design in addition to insuring perfect alignment precludes the possibility of unequal expansion of the cylinder and the sliding sleeve and permits a closer fit between these two than would otherwise be possible. The sleeve is chromium-plated. The single-ended unit is made with or without supporting base and with 4-, 8- and 12-in. traverse. The double-ended unit is fitted with supporting base.

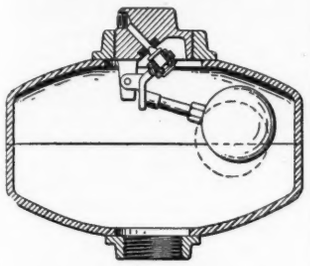
The joint is available in sizes from ¼ to 24 in. in standard and extra-heavy patterns. Those from ¾ to 2½ in. are of all-brass construction, with screw ends and screwed gland with gland follower. All sizes between 2½ and 24 in. are of steel.

Yarnall-Waring Company, 102 East Mermaid Lane, Chestnut Hill, Philadelphia, Pa. Dec. 31, page 1050.



Automatic Air-Relief Valve

Manufactured in three types for different pressures, this relief valve is designed to discharge automatically accumulations of air from pipe lines,



pumps and various kinds of tanks. It will pass air both in and out, but will close at once on liquids. By inserting a vacuum ball in the head of the valve air will be passed in one direction only.

The smallest valve, made in ⅜, ¾ and 1-in. sizes, is good for pressures up to 125 lb., with venting capacities of as high as 20 cu.ft. per minute at 60-lb. pressure. When larger amounts of air are to be relieved, a second type of valve, actuated by a float, is recommended. For pressures above 200 lb., a third series is available.

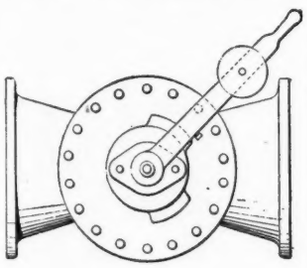
Automatic Primer Company, Chicago, Ill. Jan. 7, 1930, page 38.

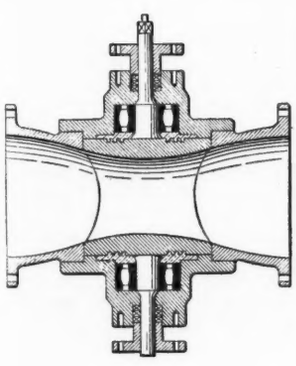
Stream-Line Quick-Closing Cock

A quick-closing cock, developed essentially as a safety emergency stop for high-pressure steam turbines where tight seating is not required, is illustrated. The valve body is made of cast steel and is machined to receive a cylindrical plug, which rotates on two roller bearings recessed inside of the body. To avoid axial displacement the plug trunnions are turned down where they leave the bearings and are extended outside of the valve body, through stuffing boxes.

The valve is arranged to close by gravity when a weighted lever is released from its 45-deg. position by the opening of a latch, which may be actuated mechanically, electrically or hydraulically.

Franz Seiffert & Company, Berlin, C 19, Germany. July 9, page 62.





Valve Operator Limits Torque on Stem

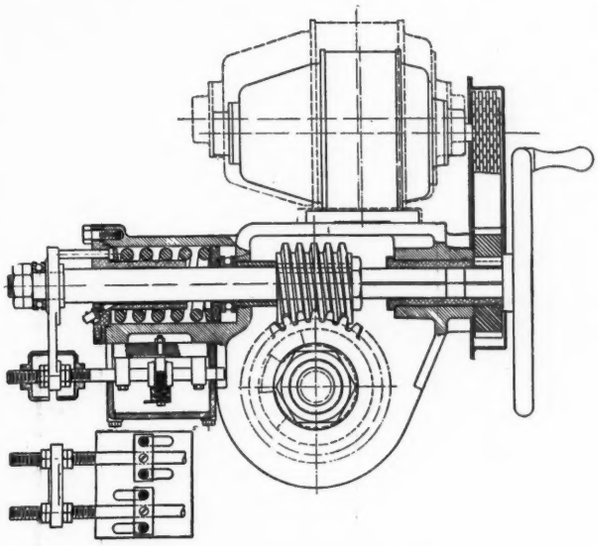
Designated the "Limitorque," this valve operator embodies such features as minimum number of parts (only one pair of gears), adaptability to either electric or air motor operation, and use of a torque switch which stops the motor when the valve is properly seated or when a predetermined torque has been exerted on the valve stem. The unit bolts directly to the flange on top of the yoke in place of the standard yoke cap. A special operating nut fitted with a ball bearing at each end has keyed to it a collar, and directly above it a wormwheel is mounted free to turn on the operating nut. A lug on the collar contacts with a lug on the wormwheel and effects the drive. It also gives a positive unseating blow at slow speed directly to the stem nut.

Control of the motor, through limiting the torque exerted on the valve spindle, is accomplished by a switch that is not geared in any way and bears no relation to the travel of the gate. It functions only when the gate is fully closed or open or overloaded. There is a handwheel for manual operation.

The "Limitorque" is adaptable to standard designs of valves with little alteration and may be adapted to existing valves already installed, without in any way disturbing the line.

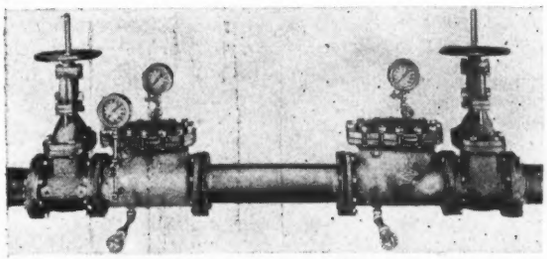
The motors are of a standard Westinghouse design, slow-speed, totally inclosed, all arranged for any standard electrical circuit to 550 volts. The motor is controlled in the usual manner by totally inclosed reversing switches with indicating lights.

Limitorque Corporation, 17 East 45th St., New York City. March 19, page 482.



Valve Assembly for Fire Protection Systems

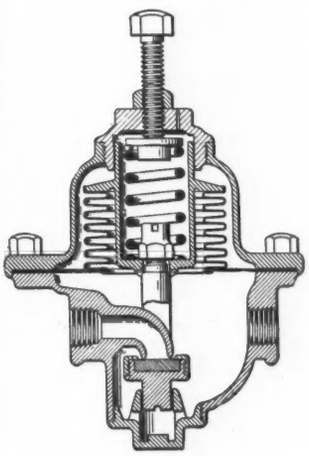
This assembly is installed as the connection between the public mains and the high-pressure fire system of a building or plant. When high pressure is built up the check valves automatically close and protect the domestic supply from pollution and prevent loss of water back through the public mains. Two (all-bronze) check valves are installed between two gate valves with a spacer (3 to 5 ft. long) between the check valves.



The valves may be bolted together if desired, but the use of the spacers guards against any ordinary material getting into the pipe from holding both clappers open at the same time.

To permit ready checking of the valves for tightness, each is equipped with a gage on either side of the clapper and with a drain on the low-pressure side. The disk holder of each valve is fitted with a special rubber facing or disk to insure tightness. The valves used in this assembly are approved by the National Board of Fire Underwriters and Associated Factory Mutual Insurance Companies, and are suitable for water-working pressures up to 150 pounds.

Jenkins Bros., 80 White St., New York City. March 5, page 403.



Bellows Pressure-Reducing Valve

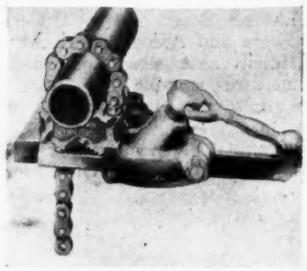
To amplify the pressure variations and thus obtain full port opening with greater capacity and increased sensitivity, a bellows is used in this reducing valve in place of the standard flat metal diaphragm. The spring is inclosed in a waterproof housing and adjustment for any desired variation in pressure is made by a screw in the top of the valve. The disk is carried from a yoke attached to the spring housing and is drawn upward against the seat by the pressure exerted on the bellows.

A removable plug at the top permits spring replacement, and a plug at the bottom likewise permits ready replacement of the composition-valve disk. Sizes from ¼ to 2 in., inclusive, are available.

Mason Regulator Company, 1190 Adams St., Boston, Mass. Jan. 14, 1930, page 69.

Chain Pipe Vise

In this improved "Vulcan" chain pipe vise the handle is placed on top, where it is easy to operate, and the jaws are readily reversible. The principal parts are made of wrought steel, and the chain is the same as that used in the Vulcan chain



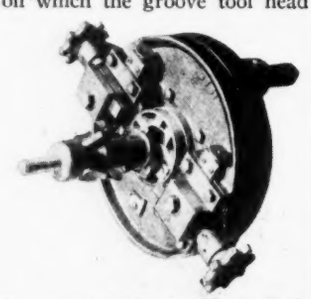
pipe tongs. The vise is finished with rustproof chromium plating and is furnished in two sizes for ⅛- to 2½- and ¼- to 4½-in. pipe, respectively.

J. H. Williams & Company, Buffalo, N. Y. Feb. 5, page 244.

Grooving Tool for Clamp-Type Joints

To facilitate the installation of Victaulic pipe joints in the field or on lines where the pipes have not previously been grooved, the machine illustrated has been developed.

It is made in five sizes, No. 12 for pipes from ½ to 2 in.; No. 20 for pipes from 2 to 3½ in.; No. 50 for pipes from 4 to 7 in.; No. 120 for pipes from 8 to 12 in.; No. 160 for pipes from 14 to 16 in. in diameter. The No. 12 tool can be hand-operated only, while the four larger sizes can be operated either by hand or by power. No. 12 follows the outside of the pipe and cuts a groove that conforms to the contour of the pipe, while in the larger machines a central spindle on which the groove tool head



is mounted is locked in the center of the pipe. The grooving tools thus rotate around a true center.

Borden Company, Warren, Ohio. Jan. 21, 1930, page 115.

Pipe of Asbestos and Cement

A seamless pipe made of asbestos and cement, known as Transite, is now available in five general classes, one of light weight designed for flue piping and exhaust stacks, and four pressure classes to carry liquids at working pressures of from 40 to 225 lb. The flue pipe is said not to be affected by ordinary stack temperatures, and the pressure pipe is suitable for delivery of hot or cold water, brine and various process liquids and solutions under pressure.

The pipe is readily cut, tapped or threaded with the same tools and in the same manner as is iron pipe. Its weight is from 50 to 65 per cent less than cast-iron or steel pipe. It is available in various diameters from 2 to 40 inches.

Johns-Manville Corporation, New York City. June 4, page 941.

Pipe Threader With Universal Guides

This pipe threader, which has universal guides that automatically center the pipe, is available in either of two types, No. 1, a plain tool without the ratchet device feature, and No. 1A, with the ratchet construction. The ratchet is built directly around

the dies, where the strain of pull comes, and, this in addition to lessening the effort required to cut the thread, permits more freedom of action when working close to a wall or in other cramped quarters. On the ratchet-type tool, the ratchet can be set for forward or reverse or can be locked for use as a plain tool by a simple turn of a control wheel.

Oster Manufacturing Company, Cleveland, Ohio. Oct. 1, page 533.

Liquid Packing for Gaskets and Pipe Threads

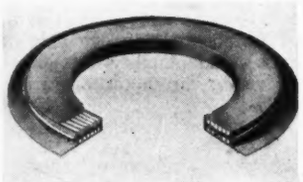
Resembling black varnish in texture and color and readily applied with a brush, this liquid filter or cement, known as "Osotite," has strong adhesive power, making it suitable for use in screw connections and gasket joints. Its important quality is that it does not set, but expands and contracts freely and therefore tends to hold joints tight under vibrations or shocks. It is impervious to oil, acids and chemicals.

W. S. Anthony, 11-19 Moore St., New York City. Oct. 1, page 534.

Aluminum Armor-Clad Gasket

In this armor-clad gasket, designed especially for severe service conditions a standard Flexitallic gasket is encased in a one-piece armor of sheet aluminum. One flange of the armor is extended to just nicely fit inside the bolt circle of the pipe flanges so that the gasket is properly centered on the pipe opening.

The aluminum armor is sufficiently soft to take care of



rough or uneven flange surfaces, and since it is rust- and acid-resisting it is suitable for a wide range of applications.

Flexitallic Gasket Company, Camden, N. J. April 2, page 558.

Plastic Metallic Packing in Four Grades

Developed for use with practically all types of machines, whether rotary or reciprocating, and with high and low pressures and temperatures, this plastic metallic packing is furnished in four grades.

Grade A, yellow label, is for general utility; temperature range, 75 to 350 deg.; on concentrated acids up to 150 deg., except nitric and sulphuric; also suited for water, corrosive chemicals, ammonia gas, steam, compressed air and alkali. Grade B, green label, is for temperatures ranging from zero to 100 deg.; suitable for refrigeration and brine pumps, cold-water pumps and dilute salt or alkali. Grade C, red label, is for high temperatures and pressures, ranging from 150 to 600 deg. and up to a pressure of 200 lb. of superheated steam; also suitable for hot gases, hot water and hot concentrated hydrochloric acid, phosphoric acid and hydrofluoric acid. Grade D, blue label, is for a temperature range from zero to 220 deg., and is suited for coal-tar derivatives, gasoline, benzol, kerosene, and oils.

The packing is put up in three sizes, 2½-, 5- and 10-lb. cans.

Magnolia Metal Company, 75 West St., New York City. June 11, page 979.

Packings for Acids, Alkalies and Petroleum Products

Three new kinds of packings designated "Cutno," "Pelro" and "Palco," suitable for use with various acids and alkalies are now available. Cutno packing is especially designed for use on pumps and other equipment where ammonia, caustic soda, hydrochloric acid, sodium carbonate and similar chemicals are handled. Pelro is suitable for use with gasoline, naphtha, alcohol and similar liquids, and Palco for hydraulic pressures, with water, hot or cold, and calcium brine.

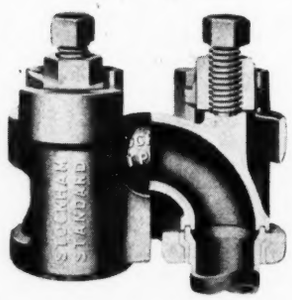
Each is impregnated with a lubricant which resists the washing-out tendency of the fluid pumped. Packings are available in braided form in sizes from ⅛ to 2 in. and in twists from 1/16 in. to ½ inch.

Greene, Tweed & Company, 109 Duane St., New York City. Sept. 17, page 457.

Return Bend Facilitates Tube Cleaning

Although developed primarily for use with tube-cracking stills, the Fantz-type return bend is adaptable to uses in power plants and other industries. It has been especially designed to reduce the time the unit must be out of service for replacement or cleaning of tubes.

Instead of being rolled in cold the tube ends are upset in the shop. This permits the use of special alloy or treated tubes. The ring joint is readily broken should it be desired to revolve or to remove a tube, and the work can be done without de-



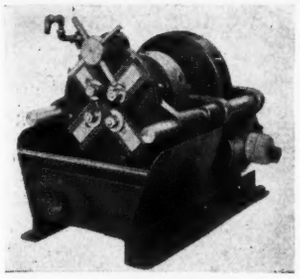
struction of tubes by cutting or damage to the assembly.

The U-piece is the only part in contact with the corrosive elements, and it can be replaced readily. It is also the only part that need be of a special corrosion-resisting alloy. The bend is manufactured to meet any specifications for pressure, temperature, tube diameter and tube spacing.

Stockham Pipe & Fittings Company, Birmingham, Ala June 25, page 1056.

Prime Movers and Auxiliaries

Diesel manufacturers have recently produced two four-stroke-cycle mechanical-injection Diesels embodying refinements in design. Small sets for stand-by and emergency service arranged for both manual and automatic starting are additional contributions.



Cutting and Threading Machine for Small Pipe

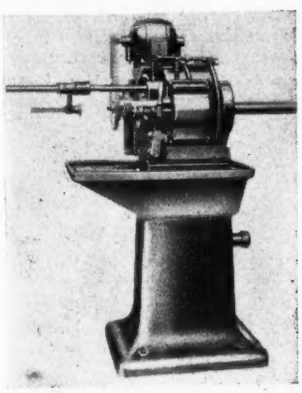
The ⅛- to 2-in. bench-type portable power pipe machine illustrated is fitted with a specially designed cutting head with four blades cutting simultaneously, and the design is such that the die heads are more easily changed from one size to another than in former models.

The machine is driven by a universal motor, and a safety friction gear is incorporated in the drive to protect against overloads. There are no levers to change or gears to shift, as all the control is centralized in the motor switch.

Toledo Pipe Threading Machine Company, Toledo, Ohio. July 16, page 104.

Revolving Head-Cutting-Off Machine

The capacity of this machine is ⅜ in. to 2 in. solid stock and ¼ in. to 1½ in. pipe or tubing. It is powered with a universal motor operating on 110 volts, single phase, of any frequency between 25 and 60 cycles or 110 volts direct current. Speed is



governed by the load put on the machine, and therefore the spindle speed increases inversely with the diameter of the stock.

The cutter head is provided with two cut-off slides mounted opposite each other in adjustable gibs in the head, and protected by felt wipers. The slides are operated radially by a scroll cam mounted on the head, the necessary accessories, such as cutting compound pump and reservoir, chip strainer and guard, being incorporated in the machine.

Oster Manufacturing Company, Cleveland, Ohio. April 2, page 557.

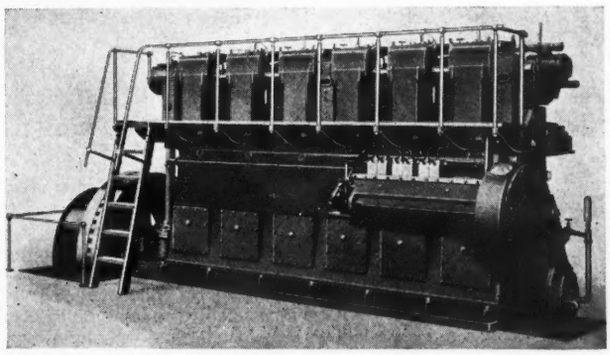
Mechanical-Injection Four-Stroke-Cycle Diesel

The frame of this new four-stroke-cycle mechanical-injection Diesel, which is built in sizes ranging from two to eight cylinders, is identical in design with that used on the Fulton air-injection engine which that company has built for several years. The new engine has a bore 13⅛ in. and a stroke of 18 in., which at 300 r.p.m. gives a cylinder unit rating of 65 hp. The crankshaft is an 8-in. solid-forged shaft with large bearing surfaces; connecting rods are also round-section forgings of open-hearth steel.

In the fuel-spray valve the needle is guided and lapped into the nozzle body, thus insuring alignment of the needle and its seat and preventing the needle from binding and sticking. The nozzle has several openings of relatively large size (approximately four times the sizes of the fuel-oil strainer openings), thus eliminating clogging. The fuel pump is mounted on the front end of the engine and is driven by a silent-roller chain. Valves, seats, plungers and liners of the pumps are of stainless steel. Each cylinder has its individual pump, and surplus oil furnished by the pump is bypassed by a valve under control of the governor. Opening and closing of each bypass valve can be adjusted individually, so that each cylinder gets its proper share of fuel and load. This adjustment can be made while the engine is running.

Lubrication of the power cylinders is by a separate metering force-feed pump, two feeds being used per cylinder.

Fulton Iron Works Company, St. Louis, Mo. Jan. 28, 1930, page 140.



Improved-Design Four-Stroke-Cycle Diesel

Built in capacities from 200 to 400 hp., this four-stroke-cycle mechanical-injection Diesel has been designed to give somewhat better fuel consumption and speed regulation than is generally obtained with the two-stroke-cycle semi-Diesel. The piston is 13 in. in diameter and has an 18-in. stroke, which permits a rating of 65 hp. per cylinder at 277 revolutions per minute.

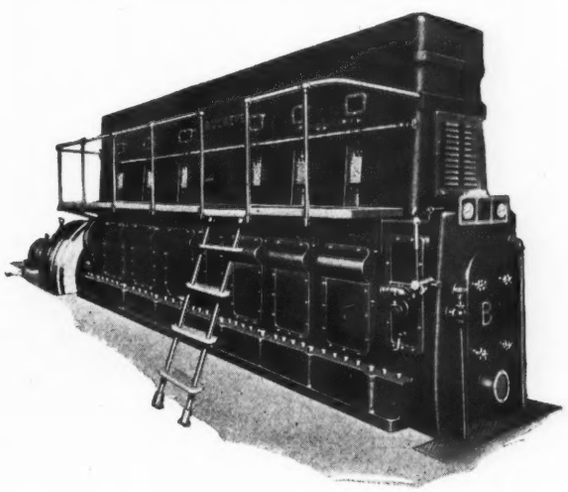
The frame is designed to give a comparatively narrow water-jacket cavity, and the space between the jacket and outer wall serves as the suction air compartment, air entering at each end through louvers and filters.

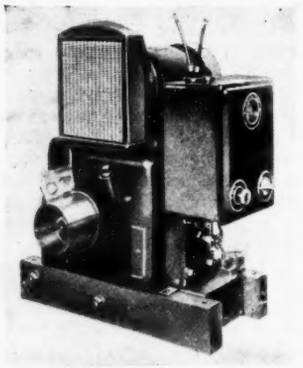
An individual fuel-injection pump is provided for each cylinder, being placed in recesses in the frame alongside the cylinder served. The point of fuel injection is constant at all loads, while duration is controlled by a bypass valve connected through linkage to the governor layshaft. The fuel nozzle is of simple design, consisting of a spring-loaded mushroom valve that admits oil into a single-hole orifice. Air enters the cylinder head through two passages set at 90 deg. This gives a whirling motion to the air as it passes through the admission valve and eliminates the need of any device to give turbulence. Built-in fuel-oil and lubricating-oil filters are embodied in the design.

Buckeye Machine Company, Lima, Ohio. Jan. 14, 1930, page 62.

Lighting Plant for Auxiliary Service

Specially adapted for auxiliary service in small isolated industrial plants, isolated office buildings and hotels, this compact, self-contained lighting plant comes in two sizes, of 750 and 1,500 watts capacity, respectively. In the unit assembly the prime-mover is a Fairbanks-Morse self-oiling "Z" engine. The smaller unit is designed to operate on gasoline as fuel, while the larger engine can use either gasoline or kerosene. The generator is a ball-bearing machine mounted directly above the engine, with a Flex-Mor V-belt drive. In the "belt" position the generator is disconnected from the engine, so that the entire power output is avail-





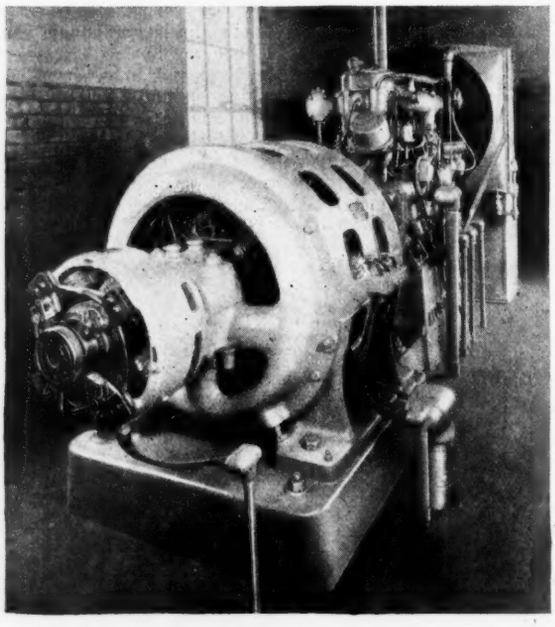
able for mechanical work from a pulley on the engine shaft.

Both the 750- and 1,500-watt units can be had in voltages of 32 and 115. The floor space required is: height, 25½, 30½ in.; width, including crank, 23¼, 30¼ in.; length, 26, 32 in.; and the shipping weight, 275 and 500 lb., respectively. A variety of storage battery combinations that will meet almost any demand for either a 32-volt or standard 115-volt circuit is also available.

Fairbanks-Morse & Company, Chicago. Dec. 17, page 976.

Generating Unit That Operates Automatically

This line of automatic gasoline engine-generator sets includes units up to 275 kw. capacity. In addition to the generating units, the automatic gasoline engine can be furnished direct connected to a centrifugal pump or other unit which may be ordinarily operated electrically and to which it is desired to connect a prime mover to operate automatically.



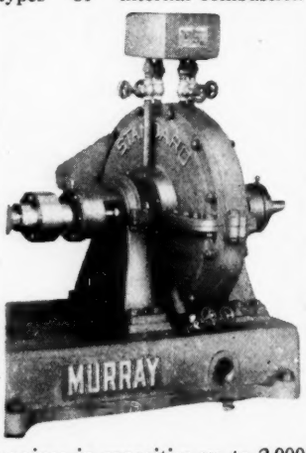
In the set illustrated the engine is a Sterling four-cylinder heavy-duty marine unit designed to operate at 1,200 r.p.m. The generator is an Allis-Chalmers 480-volt, 60-cycle machine, with direct-connected exciter. Engine control equipment, which is designed to start the unit when the primary supply of power fails and to shut it down when service is again restored, is built by the Cutler-Hammer Manufacturing Company.

The engine is equipped with three spark plugs per cylinder, each fed by a separate system of ignition. It has dual overhead valves for both inlet and exhaust and a governor to maintain uniform speed.

J. H. Weir Company, Wilkes-Barre, Pa. July 30, page 186.

Absorption Dynamometer

An absorption dynamometer for use in testing steam turbines, steam engines, and the different types of internal-combustion



engines in capacities up to 2,000 hp. is illustrated. The machine comprises from one to ten disks revolving in compartments formed of series of diaphragms. As the discharge valves are closed off or the inlet valve opened, increasing the braking water surface against the disks, the load is increased, or vice versa. The main bearings are deep-groove ball bearings for the smaller sizes and self-aligning turbine bearings with forced lubrication for the larger sizes.

The casing is cylindrical and supported on roller bearings to permit rocking and recording the torque on a scale beam. The bearing supports are so arranged that all the losses are recorded as load on the scale beam, thus eliminating all corrections.

Murray Iron Works Company, Burlington, Iowa. June 4, page 943.

Small Belt-Driven Generating Units

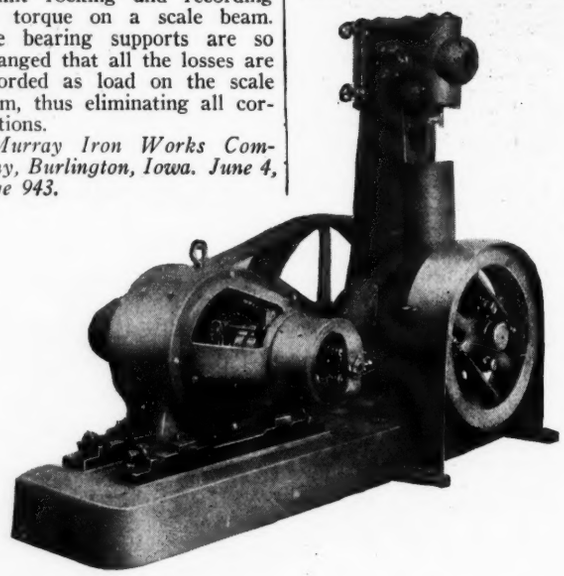
Texrope-driven units of the type illustrated are now available in capacities from 3 to 31½ kva. The unit shown consists of a standard four-pole stationary-field-type alternator with direct-connected exciter, connected to the engine by Texrope belts and mounted on a common cast-iron sub-base with a standard vertical inclosed engine. The alternator and exciter both are fitted with ball bearings, and the generator is mounted on slide rails to provide a ready means of adjusting the tension on the belts. The advantage of this type of unit over the regular belted installation is that it takes much less space than would be necessary with the regular belt and slightly more than a direct-connected unit of the same capacity. The small size also permits the unit to be mounted on a common base and to be tested at the factory and shipped as a unit.

This same line of small generating units includes a direct-connected set similar to the standard line of machines put out by the same company except that the generator has a stationary instead of revolving field, and a direct-connected exciter, the range of these sets being from 12½ to 125 kva. The engines are especially designed for high pressures and superheated steam, and are fully inclosed, with counterbalanced crankshaft, piston valve and automatic- or throttling-type governor.

Enberg's Electric & Mechanical Works, St. Joseph, Mich. July 9, page 61.

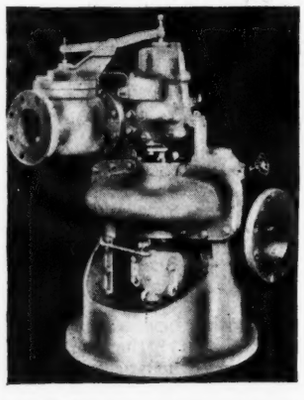
Vertical Steam-Turbine Unit

Two frames of vertical machines are included in this line of turbines, developed especially for driving deep-well pumps, vertical fans and pulverizers or



other auxiliaries. They are equipped with constant-speed and emergency governors operating independent valves, and may also be equipped with constant-pressure governors. The turbine casing is split vertically and the bearing caps and governor are readily accessible.

Blading and nozzles are of standard, non-corrosive, non-erosive type, and packing is carbon, steam-sealed. All disks are forgings, with two rows of blading on each wheel. The turbines are equipped with extra nozzles for overloads or decreased steam pressure ar-

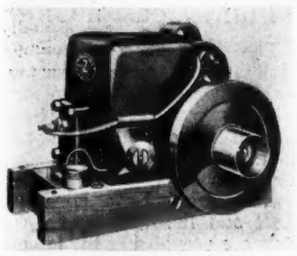


ranged for manual or automatic operation, as required.

Murray Iron Works Company, Burlington, Iowa. July 9, page 61.

Enclosed Engine for Portable Services

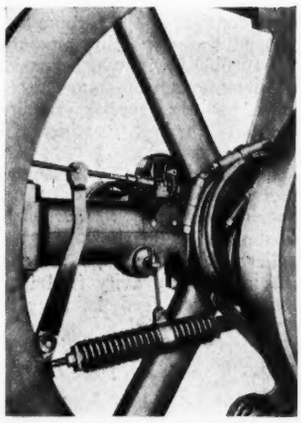
In this line of small gasoline-kerosene engines the engine is completed inclosed, and grease cups are replaced by a self-



oiling system. The unit illustrated is 1½ hp. It is less than 16 in. high, 22 in. long and 19 in. wide, and weighs 150 lb. Two pulleys are on opposite sides of the engine, one operating at an engine speed of 1,500 r.p.m., and the other at 750 revolutions per minute. Features to abolish leaking oil and crankcase compression are incorporated in the design.

Unit construction throughout makes the cylinder, water hopper, crankcase and bearing supports for both crankshaft and camshaft integral parts of the cylinder and base casting. The engines are particularly suitable for driving portable pumps, air compressors, small generators and similar equipment.

Fairbanks, Morse & Company, Chicago, Ill. July 23, page 141.



Speed-Changing Device for Inertia Governors

This speed-changing device has been developed to facilitate synchronizing two or more engine-generator units. It consists of a reversible-type motor mounted within the flywheel, which, through a worm and screw, changes the tension of the governor's mainspring, thereby changing the speed of the engine.

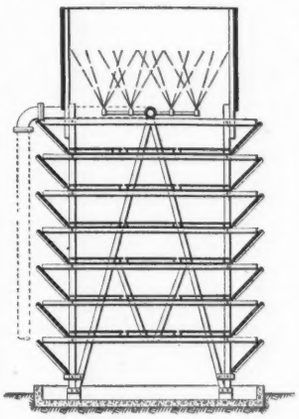
It may be applied to all Chuse uniflow and corliss engines using a centrifugal-inertia governor. No changes are required to be made on the present governor other than omitting the spring screw bracket in the rim of the wheel. Therefore it can be used on engines now in operation.

Mattoon Engine Works, Mattoon, Ill., successor to the Chuse Engine Manufacturing Company. Dec. 17, page 976.

Spray Deck Cooling Tower

The spray deck tower illustrated combines the advantages of the standard deck-type towers and spray ponds. Tower, troughs, launders and flumes are eliminated, and a spray pond is used in their place at the top of the unit. Large open-type spray nozzles are employed. The spray system is supplied by a main distributing header to which all nozzles are attached. Louvering is provided in panels of a size and weight convenient for handling. Decks are sectional, light in weight and designed to provide for 50 per cent free area for the flow of air. This design of tower tends to give uniform distribution and maximum break-up of the water, increased air circulation, reduced height of tower and pumping head, and maximum heat transfer.

Marley Company, Kansas City, Mo. Dec. 24, page 1012.

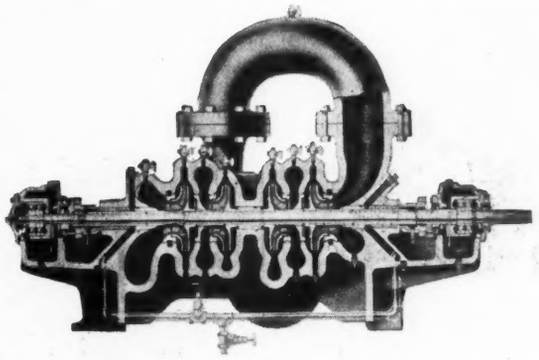


Pumps for Power Plant and Industrial Uses

Wider adoption of ball bearings, use of higher speeds to reduce size of pump for given capacity and new bearing construction for submerged-type pumps are improvements noted in recent pump designs.

High-Pressure Multi-Stage Centrifugal Pump

High-speed (3,540 r.p.m.) opposed impellers to reduce end thrust and the use of double-guided glands are features of this high-pressure multi-stage centrifugal pump, which is especially adapted to boiler feeding, general water supply, pipe lines and similar services. It is made in capacities from 400 to 1,200 gal. per minute for pressures up to 600 pounds.



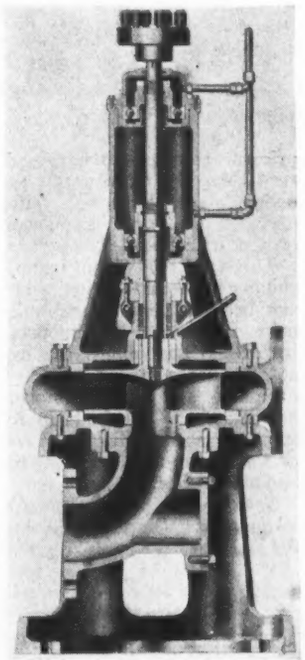
The pump casing, of cast-iron alloy, is split horizontally, with the suction and discharge connections in the lower half. The bronze impellers are of the inclosed type and are opposed in pairs to eliminate end thrust at all ratings. The shaft is carried in double-row ball bearings, the outboard bearing being arranged to take care of any unbalanced thrust on the shaft.

Stuffing boxes are fitted with double glands guided at both ends to prevent cramping the gland on the shaft. The outer guide has a detachable cap that permits removal of the gland proper for inspection or renewal of packing. Seals are interconnected, and valves are provided for controlling the pressure on each stuffing box to best meet operating conditions.

Goulds Pumps, Inc., Seneca Falls, N. Y. July 2, page 23.

Improved Non-Clogging Centrifugal Pumps

Three new non-clogging designs containing numerous mechanical improvements that make for longer life comprise this line of centrifugal pumps for sewage service. They are planned especially to handle rags, sticks, stones, etc., without clogging and without the use of strainers. They are made in capacities from the 3-in. 100-g.p.m. unit that will handle 2½-in. spheres to the 10-in. 5,000-g.p.m. pump that will pass 7-in. spheres. Pumps of all capacities are made in vertical sub-



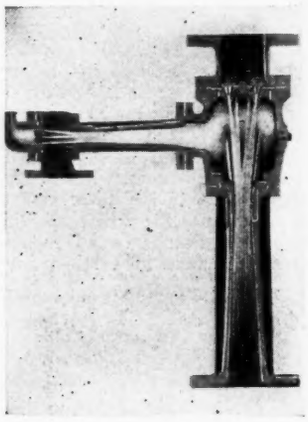
merged design, vertical open-shaft design, horizontal direct-connected, or belt-driven.

The vertical submerged type is used principally for handling sewage in buildings and industrial establishments where a self-contained unit is desired. The impeller hub is covered with a steel sleeve that acts as the lower journal, making it possible to extend the lower bearing close to the impeller, thus increasing the bearing life and removing all journal wear rom the pump shaft. The bearing at the upper end of the shaft is a combination radial-and-thrust ball bearing mounted in a dust-proof housing with double-nut micrometer adjustment. Horizontal pumps of the non-clogging design suitable for handling sewage, sludge, foodstuffs, paper stock and any other stringy or pulpy material are included in this line. They are of rigid design with roller outboard bearings that carry the entire weight of the rotor, there being only a shock bearing within the pump casing.

Economy Pumping Machinery Company, Chicago, Ill. May 7, page 758.

Jet-Type Vacuum Pump

The hydro-steam, two-stage vacuum pump shown operates without inter- or after-condensers. The multi-nozzle steam-jet



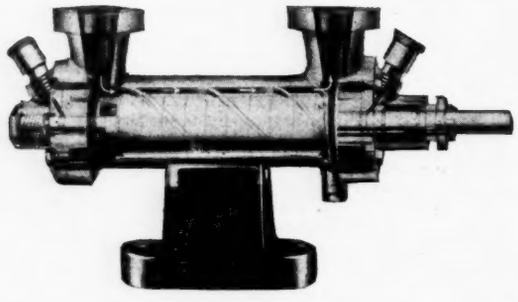
primary machine discharges directly into the multi-nozzle secondary stage, which is a water-operated unit. Both stages work on the jet principle.

This type of vacuum pump is suitable for installation where simplicity of piping and minimum regulation are important features. The pumps are capable of producing vacuum in excess of 29 in. for normal operation, and are built in five standard sizes, with suction connections varying between two and six inches.

Schutte & Koerting Co., Philadelphia, Pa. April 30, page 718.

Self-Priming, Valveless Screw Pump

In this screw-type pump the rotor is made up of a number of disks mounted on a shaft. Two diametrically opposite slots are cut in each disk and a blade fits loosely in each slot. With all the blades in position the equivalent of a double-screw thread is formed on the rotor, the blades being kept in contact with the cylinder bore by centrifugal force.

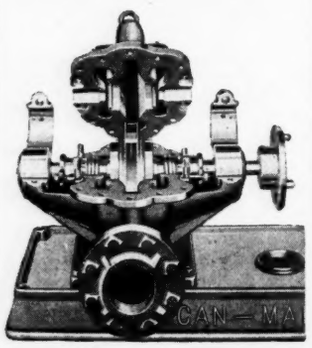


Liquid entering the pump through the inlet is caught between the two threads formed by the blades and caused to flow through the length of the cylinder to the discharge in essentially straight stream lines parallel to the axis. Any wear on the blades is taken up automatically without affecting the efficiency of the pump or the rate of discharge.

S. A. M. Pump Corporation, 11 West 42d St., New York, March 12, page 445.

Ball-Bearing Pumps for Industrial Services

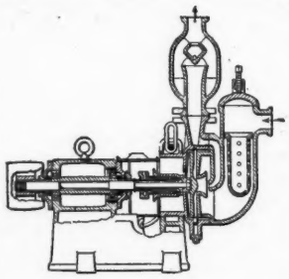
Both the low- and high-head units included in this line of centrifugal pumps for general service are of the double-suction type, with the casing split horizontally at the center line. Bearng supports and suction and discharge connections are cast integral with the lower half of the casing. The impeller is inclosed, with a non-overloading characteristic. The shaft furnished on the low-head pump is of open-hearth steel, protected on each side of the impeller and through the stuffing boxes by removable bronze sleeves. The shaft furnished on the high-head pump is of stainless steel, and no protecting sleeves are used.



The shafts are carried in oversize self-aligning ball bearings designed to take care of thrust and radial loads.

The low-head pump, which is designated type HL, is available in sizes from 1½ to 6 in., with capacities ranging from 90 g.p.m. at 40-ft. head to 1,200 g.p.m. at 82-ft. head. The high-head pump, designated type HS, is available in sizes from 1½ to 4 in., with capacities ranging from 100 g.p.m. at 175-ft. head to 600 g.p.m. at 230-ft. head. Pumps are also available with the casing built of a non-corrosive or acid-resisting alloy.

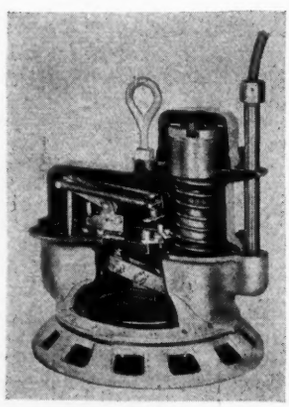
American Steam Pump Company, Battle Creek, Mich. Oct. 22, page 651.



Self-Priming Centrifugal Pump

In this pump all parts that come in contact with the liquid being handled are of Duriron. Capacity is 60 gal. per minute against a head of 60 ft. and at a speed of 1,750 r.p.m. An air separator is mounted in the discharge directly above the pump casing, which serves to return the liquid to the suction in case the suction column is broken. The impeller of the pump is of the open type, to prevent clogging when liquids containing solids are handled. The strainer in the suction is readily accessible for cleaning by removing the cap.

Duriron Company, Dayton, Ohio. Dec. 3, page 900.



Submerged-Diaphragm Switch for Pump Control

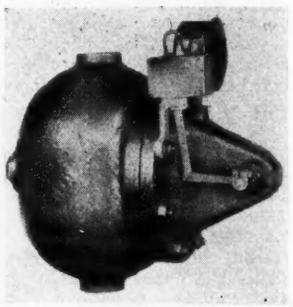
Inclosed in a water-tight housing which requires no special mounting, this submerged-diaphragm switch is particularly recommended for inaccessible locations or places having insufficient headroom for the conventional float switch with its chain or rod and counterweight. It may be suspended at any depth in the tank or placed on the bottom, and a dip of 20 deg. will not interfere with its operation.

The switch mechanism is of quick make - and - break type, operated by pressure of the water on the under side of the rubber diaphragm. The housing proper is submerged, and electrical connection is made through rubber-covered cables.

Barrett, Haentjens & Company, Hazleton, Pa. Sept. 24, page 498.

Pump Control Unit

The illustration shows the McKee float control for use with condensation systems and boiler pump units: A short-arm float is incased in a cast-iron body or chamber and is connected to an external positive-contact switch by a horizontal shaft and links. Pipe connections are provided at the top and bottom of the float chamber for



connecting it to the boiler or receiver at the proper level.

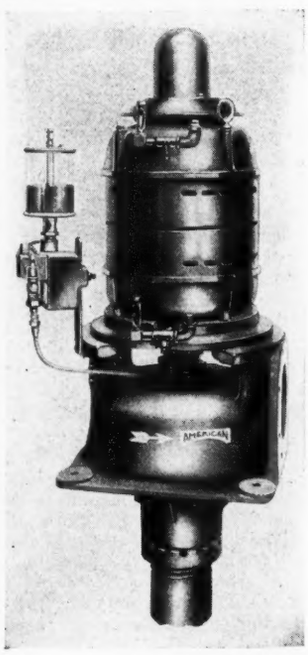
Eclipse Fuel Engineering Company, Rockford, Ill. January 21, 1930, page 115.

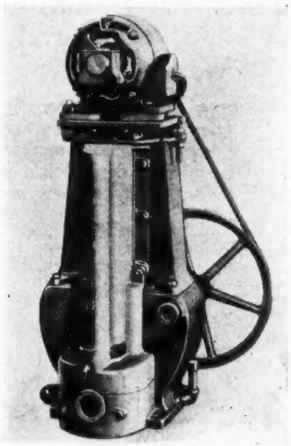
Deep-Well Turbine

Designed especially to fit the smaller bored wells, this line of deep-well turbines in 6- and 8-in. sizes consists of the turbine head proper, the supporting pipe, and the turbine itself, which consists of the number of stages necessary for the specific requirements of the well in which it is to be used.

The driving head is a vertical motor equipped with a thrust bearing designed to carry the load of the lineshaft and impellers. All bearings are oil-lubricated by gravity feed from the surface, feed being electrically controlled.

American Well Works, Aurora, Ill. June 25, page 1055.





Fully Inclosed Deep-Well Pump

Improved forced-feed lubrication, V-belt drive, fully inclosed operating mechanism and simplified air compressor are among the important features claimed for this deep-well pump. A new lubrication system and simplification of the air compressor has reduced the number of working parts to a minimum. The pump is designed for use where the vertical lift exceeds 35 feet. The drive between the motor and the pump is made by means of a V-belt.

Deming Company, Salem, Ohio. Sept 24, page 497.

Regulators and Controllers

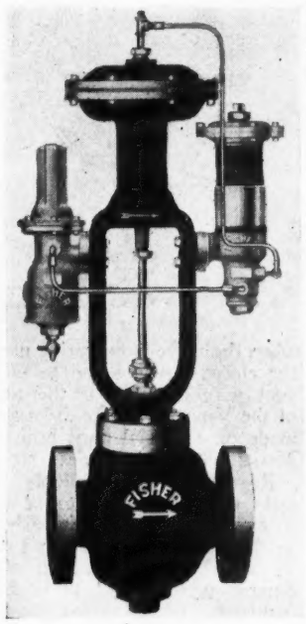
The use of auxiliary pilot valves to control the operation of the main valve and the elimination of stuffing boxes wherever possible are features of recent designs of pressure regulators and controllers. Also feed-water regulators embodying refinements in design to give more satisfactory control of the water level from no load to 200 to 300 per cent of rating represent important advancement in control apparatus.

Auxiliary-Operated Pressure Controller

All moving parts of the main valve and the two control units which comprise this auxiliary-operated pressure controller are entirely inclosed and are incorporated in one compact unit, so that no additional interconnecting piping is required.

Three types or arrangements are available, the one illustrated for use on a horizontal pipe line, with the control units mounted on the bonnet; a similar type for installation on a vertical pipe line in which the control units are placed vertical or at right angles to the main valve bonnet; and one in which the two control units are mounted on a panel board separate from the main valve.

Four distinct classes of service come within the range of the regulator. They are reduced-pressure regulation, relief- or back-pressure service, auxiliary vacuum control, and auxiliary differential pressure control. In addition, it can be used as a make-up valve in connection with a back-pressure turbine where steam is used in process work. Also for reducing the high pressure of a new boiler installation to the low pressure of the existing boiler units and prime movers.

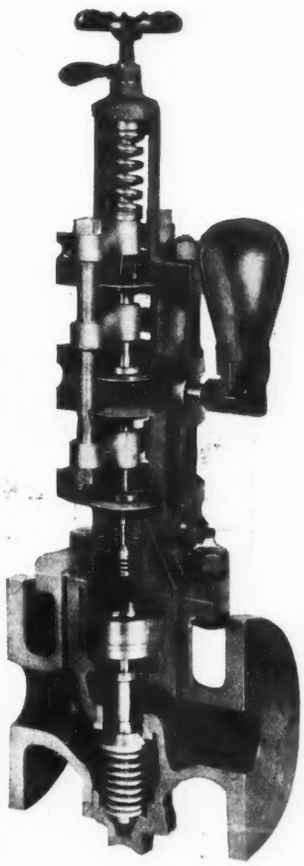


Fisher Governor Company, Marshalltown, Iowa. Jan. 28, 1930, page 153.

Excess-Pump-Pressure Regulator

Sensitiveness is one of the outstanding features of this excess-pump-pressure regulator (Class X), being made possible by elimination of stuffing boxes on any moving part. In place of the usual central spindle, diaphragms are clamped between flanges in the valve, bonnet, and the movement is imparted from one diaphragm to the other by external crossheads.

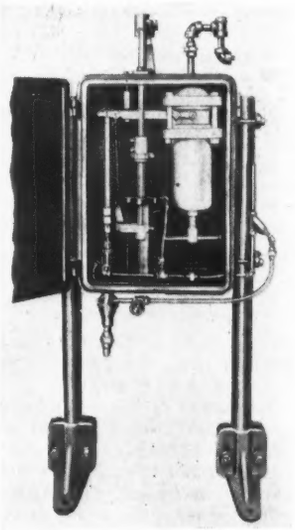
The boiler-feed-line pressure and the boiler pressure are connected on either side of a pair of diaphragms. These two pressures therefore oppose each other, with the boiler pressure



assisted by an adjustable spring. Any movement of the diaphragms is transmitted through external crossheads to the two lower diaphragms and, in turn, to the pilot valve. When the pilot valve opens, steam is admitted above the piston, which is forced downward, opening the main valve and admitting sufficient steam to the pump to maintain the desired excess pressure on the boiler-feed line.

The valve is made of bronze, with renewable wearing parts of stainless steel, nickel alloy and bronze suitable for superheated steam up to total temperatures of 550 deg. F. It is designed for steam pressure up to 300 lb., excess pressure from 10 to 200 lb. up to a maximum boiler feed pressure of 450 lb. Valves with screw ends in sizes from ½ to 2 in., and with flanged ends from 1 to 3½ in., inclusive, are available.

Leslie Company, Lyndhurst, N. J. Jan. 28, 1930, page 152.



Combustion Control Designed for Close Regulation

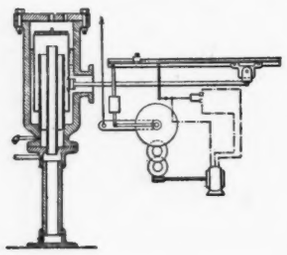
A variation in pressure of less than one-tenth of a pound gives a sufficient impulse to operate this combustion control, and by reason of the small impulse required it responds readily to any load change. It has three variable characteristics — pressure range, stroke range and time range. The pressure range is determined by the size and adjustment of a compression spring, the time range by the clearance on an oil dash pot, and the stroke range by a link-lever mechanism at the back of the control box. The boiler pressure is connected above the diaphragm, the movement of which controls the position of the pilot valve and in turn the actuating piston connected with the damper or other unit under control.

The mechanism on the back of the box, which houses the control, consists of a system of levers linked together in various positions and so arranged that they can be changed to properly fit the stroke of the control to the stroke of the valve or damper. The range that can be covered by this lever mechanism is from 2 to 30 in., and a toggle effect is incorporated whereby the first quarter opening of the valve or damper is slow compared with the last quarter. This feature tends to smooth out the operation of the unit to which the control is connected and to obviate hunting.

Gillette - Vibber Company, New London, Conn. Dec. 10, page 940.

Volume-Flow Regulator

This volume-flow regulator for air and gas is adaptable to a number of services and is designed for an initial pressure of 100 lb., with a maximum allowable variation of 2 per cent. It consists of a heavy casting containing a bell in an oil seal. The



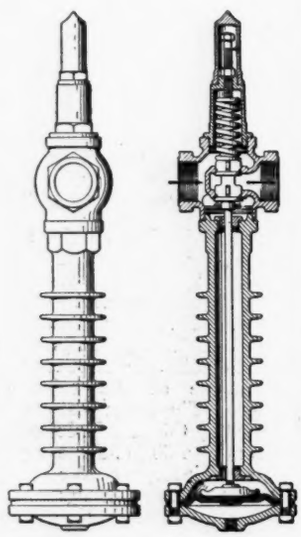
vertical movement of the bell is mechanically magnified by means of a long arm.

Movement of the balance arm is communicated to a set of electrical contacts, which cause a small motor to run either forward or backward. Through a reduction train the motor drives an operating arm which is connected to the valve or damper to be controlled. Movement of a small weight on the balance arm permits immediate change from one operating differential to another.

Brooke Engineering Company, 1321 Arch St., Philadelphia, Pa. Aug. 20, page 299.

Excess-Pressure-Pump Regulator

Absence of packing, giving free movement to all working parts without tendency to stick or bind, marks this excess-



pressure-pump regulator designed to control a reciprocating or turbine-driven steam pump. The regulator is installed in the steam-supply line of the pump, with the diaphragm chamber downward, as shown. This chamber is connected by a small line to the discharge of the pump. The amount of steam passed through the valve to the pump is controlled directly by the pressure maintained on the feed line.

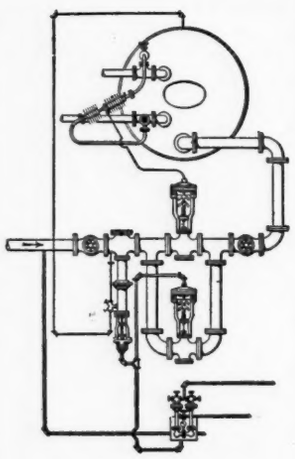
An adjusting screw provides a ready means of varying the excess pressure to any value. The regulator is made in sizes of ½ to 3 in., inclusive.

Julian D'Este Company, Boston, Mass. Oct. 29, page 693.

Feed-Water Regulator for Large Boilers

To take care of the new duties imposed upon the feed-water control equipment by the larger boiler units operating at higher ratings a master control and an additional feed valve have been added to the standard S-C regulator.

At normal, and considerably above normal, rating the regular valve is sufficient to take care



of required feed. But in event of a sudden increased demand on the boiler, the pressure in the drums drops slightly, the ebullition increases and the water level rises correspondingly. When this takes place the regular valve tends to close owing to the higher water level, while actually more water must be fed to take care of the increased steam demand.

To do this a second valve is inserted in a bypass around the regular valve, with the diaphragm chamber connected to the master control, which, in turn, is connected with the inlet and outlet of the superheater or across an orifice. The master control is arranged to open the secondary valve when the drop through the superheater or across the orifice reaches a certain value, the drop varying directly with the rating on the boiler. As the differential pressure must also be changed with an increased demand, an additional diaphragm head is added to the standard excess-pressure valve and connected with the differential master control. This head is used to give increased loading only, and is not connected in any way with the operating stem of the valve.

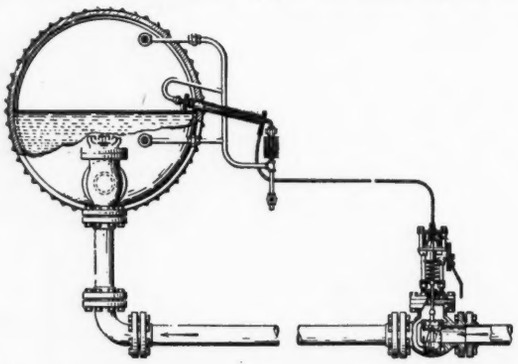
For higher pressures a special design of valve and seat is used. Regulators are now available for pressures up to 1,350 pounds.

Swartwout Company, Cleveland, Ohio. April 30, page 719.

Thermo-Hydraulic Feed-Water Regulator

In the thermo-hydraulic feed-water regulater illustrated the feed or regulating valve is fitted with V-ports designed to give changes in rate of flow proportional to the valve opening at any point, and to be tight seating. The regulator consists, essentially, of three parts: a generator to supply the pressure for operating the control valve, a bellows-operated regulating valve and interconnecting tubing or piping. The generator is of welded construction and is furnished as a completely assembled unit. For pressures above 400 lb. it is made of heavy-wall steel tubing, with welded joints and flanged connections.

Design of the regulating valve is such that it may be placed in a vertical or horizontal pipe line at a point either above or below the boiler water level. The valve cage is of one-piece construction and is screwed into the lower inner wall of the valve body, while the top of the cage is made tight in the body by a sealing flange and a clamping nut. Another feature is the use of a recess at the bottom of the 45-deg. angle seats to distribute the flow evenly around the disk



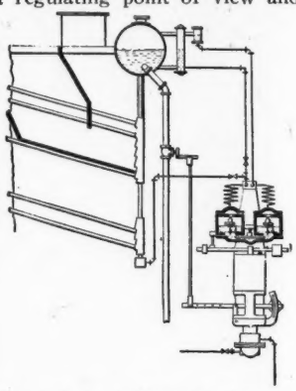
when the valve is operating near the closed position and to prevent wire drawing at the tips of the V-ports. Valve disks are made of a special hard bronze. Monel metal or stainless steel.

Regulators are available in sizes ranging from ½ to 12 in. The regulating valve is furnished in the screwed type from ½ to 2½ in., inclusive, and in the flanged type from 1 to 12 in., inclusive. Globe valves can be furnished in all sizes, and angle valves from ½ to 4 in., inclusive.

Bailey Meter Company, Cleveland, Ohio. July 30, page 187.

Feed-Water Control Varies Water Level With Rating

Design of this feed-water control is based on the theory that a water level gradually increasing with rating is desirable from a regulating point of view and

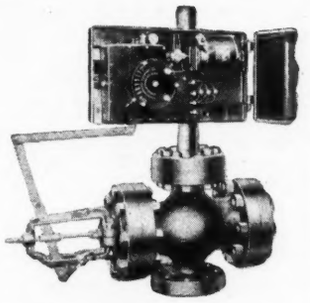


that it is basically safer from an operating standpoint. To obtain this the regulator is connected with an auxiliary loading force which bears a definite relationship to the boiler rating.

The control element for the water-regulating valve consists of two interconnected mercury chambers mounted on knife edges and connected with the steam and water space of the boiler. The bottom of one chamber is connected through a link to a weigh beam, which actuates the regulator power mechanism. Two mercury chambers, with their connection to the boiler, act as a large U-tube, and the difference in weight of mercury from one chamber to the other varies directly with the head of water in the boiler.

The auxiliary loading force to give an increasing water level with rating is obtained by utilizing the differential pressure from the boiler drum to the mud drum to vary the pressure in the connecting lead to one of the mercury chambers. This differential serves to give a loading effect in direct relation to the rating at which the boiler is being operated. More stability is the effect of this control, and it makes possible utilization of the boiler drum capacity for water storage to its full value.

Smoot Engineering Corporation, 136 Liberty St., New York City. Nov. 12, page 768.

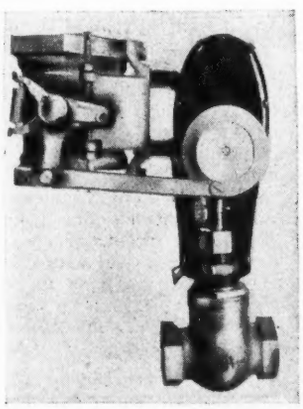


Flow Control for High Pressures

Adaptable to the control of high-pressure steam, water, process liquors or gases, this flow-control valve embodies a forged-steel manometer and a specially designed remote-control device mounted above the valve, as shown.

The unit is designed to operate The unit is designed to operate at 1,300 lb. pressure and 600 deg. temperature. Controls with valves suitable for any pressure up to this point are obtainable.

Brown Instrument Company, Philadelphia, Pa. Aug. 27, page 349.



Regulators for Temperature, Pressure and Combustion

Included in this line of industrial regulators are motor valves, pressure and thermostatic equipment and devices for safeguarding combustion equipment in the event that oil or gas fires should be extinguished or other emergencies arise. Motor valves are obtainable in globe valve sizes from ½ to 3 in., with or without a butterfly valve of 2 to 6 in. operated simultaneously. In each type the motor operates a cam through a train of spur gears to fully open or close the valve being controlled. A ratchet device makes possible manual control of the valve at any time without disturbing the electrical control feature. The line also includes motor- and solenoid-operated valves for shutting off oil or gas in heating installations.

Controlling instruments are provided in the form of temperature and pressure regulators of the mercury-switch type. The temperature regulators employ a bi-metallic element.

Combustion controllers are of three types. One is arranged to close valves or operate signals when the fire goes out. Another is adapted to control combustion, dependent upon flue-gas temperatures, and the third employs a vapor-pressure thermometer system to open a snap switch in case the temperature goes too high.

A control of unit heaters, in which some of the equipment described in the foregoing is combined with other apparatus previously developed in connection with building heating, is also available.

Minneapolis-Honeywell Regulator Company, Minneapolis, Minn. Dec. 3, page 899.

Indicating Controller

This "Tag" indicating controller has been designed to meet the demand for a mercury instrument with a wide range. It is identical in design with the recorder controller except that it is arranged to indicate the temperature rather than record it. The indicating and setting pointers operate across a scale covering a range graduated in actual degrees.

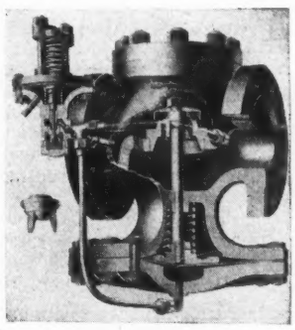
Some of the important features of the instrument are: Improved round form case construction with all air gages inclosed within the case and visible through the front cover;

outside, direct adjustment of the setting pointer; fully compensated mercury system that gives a wide range; and a special pilot air valve by means of which throttling control or "on and off" may be had.

C. J. Tagliabue Manufacturing Company, 18-88 33d St., Brooklyn, N. Y. Jan. 7, 1930, page 38.

Pressure Regulator With Auxiliary Pilot Valve

One of the important claims made for this improved pressure regulator, which is built in sizes ¼ to 12 in. for use on air, steam oil and gases with pressures up to 400 lb. and temperature of 750 deg., is its ability to give constant delivery pressure regardless of the fluctuations in the initial pressure. Under normal conditions the delivery pressure does not vary more than ½ lb., and the initial pressure can drop to within 1 lb. of the discharge pressure without affecting the pressure on that side of the valve.



An auxiliary valve separate from the main valve is used as a master control for the regulator. This allows the main valve to be of much simpler construction that would otherwise be possible, and the pilot is more readily accessible for inspection and repairs than when it forms an integral part of the main valve. Large diameter, balanced metal diaphragms and seats of special metal and renewable are used. The seat and disk of the main or pilot valves can be renewed or reground without removing the valve from the line.

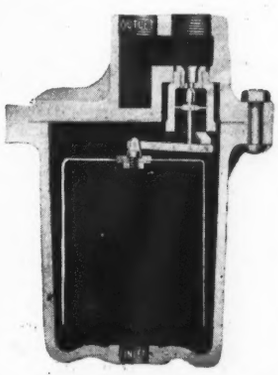
For pressures up to 250 lb. and 450 deg. temperature the regulators are furnished with cast-iron bodies, and with cast-steel bodies for pressures up to 400 lb. and 750 deg. Screwed ends are furnished up to 2-in. sizes, and standard, extra-heavy or 400-lb. flanges above 2-in. All regulators have chromium-steel seats, and renewable disks in the sizes up to 3 in. Above 3-in. all-metal disks are standard. This valve is designed to be equally applicable to heating systems, power plant operation and manufacturing processes.

Spence Engineering Company, Inc., 110 East 42d St., New York City. May 21, page 838.

Steam Traps

Inverted-Bucket Steam Trap

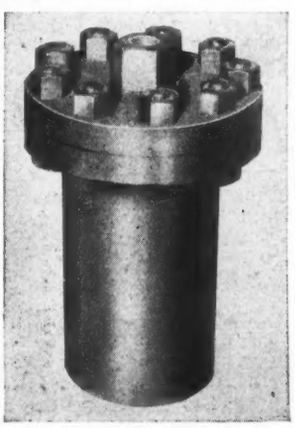
With the exception of the bucket, which is made of spun copper, all operating parts of this inverted-bucket-type steam trap, designated 20 Series, are made of "Anum-Metl." All the parts are readily accessible by removing the flanged cover. The trap which is built for all operating pressures in semi-steel bodies up to 225 lb., pressure is made in five sizes with standard pipe connections ranging from ½ to 2 in. Based on 125-lb. operating pressure, the capacities range from 800 lb. for the ½-in. trap to 12,000 lb. for the 2-in. trap.



Strong, Carlisle & Hammond Company, Cleveland, Ohio. May 21, page 837.

Trap for High Pressures and Temperatures

The heavy forged pattern of this trap is built for pressures up to 900 lb. and the extra-heavy pattern for pressures up to 1,350 lb. Both types will operate at temperatures up to 750 deg. F. These traps embody the inverted submerged-bucket principle and have stainless-steel operating parts. Because of their small size and relatively light weight, no special support is required other than the pipes on which they are installed.

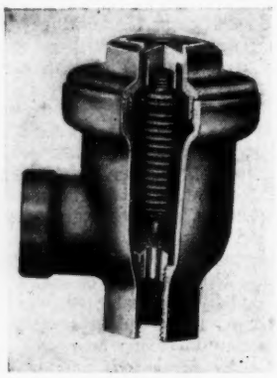


Armstrong Machine Works, Three Rivers, Mich. June 4, page 942.

Bellows Trap for Process Service

This small, compact steam trap is especially adapted to use in all types of process work where the steam pressures range from 0 to 125 lb. and the temperature does not exceed 400 deg.

The bellows, which constitutes the only moving element, has



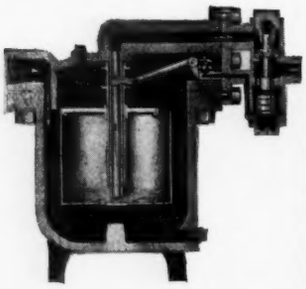
sufficient strength to withstand any water hammer that might be encountered. The valve point attached to the bellows is made of nitrided steel, which is highly resistant to rusting and scoring. The valve seat is of monel metal and is readily replaceable. Three sizes, ½, ¾ and 1 in., with capacities of 500, 650 and 850 lb. of water per hour, respectively, are available.

W. D. Cashin Company, 35 Hartford St., Boston, Mass. Aug. 27, page 347.

Trap for Steam, Gas, and Air

Designed for use with steam, gas or compressed air, and to operate through a wide pressure range, the McAuley super-trap illustrated is built for working pressures up to 800 lb. All working parts, which are of non-corrosive materials, are assembled on the cover and can be removed from the body as a unit. The valve and seat are made extra heavy to allow for reseating, and a cap is provided above the valves to facilitate the work.

When used with compressed air the trap is connected the same as for steam, except that

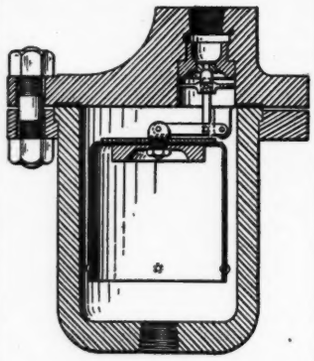


an air connection is made to the cover to provide pressure for operating. It is made in six sizes, with inlet pipe connections ranging from ½ to 2½ inches.

McAuley Automatic Trap Company, Pittsburgh, Pa. Nov. 12, page 768,

Forged-Steel Trap

Built in sizes from ¾ to 2 in. and for any pressure and temperature, the body of this forged-steel trap is made from a billet. A shoulder is formed at the open end of the body and a recessed forged-steel flange is shrunk on against the shoulder. The cover, which carries the valve seat and outlet connection, is also of forged steel and is secured to

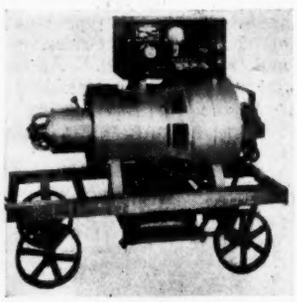


the body flange by stud bolts with a nut on each end. All working parts and pins are of "Anum" metal.

Strong, Carlisle & Hammond Company, Cleveland, Ohio. Jan. 28, 1930, page 152.

Welding Machines and Accessories

The introduction of two-operator welding units in both single and double generator sets, improved design of dual-driven and welder-compressor units, and the development of new welding rods which give greater soundness, strength and ductility to the weld than has been possible to attain heretofore, comprise the principal trends in this field.



Welder With Unified Control

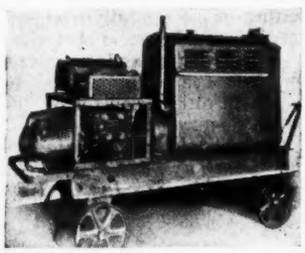
Unification of the controls of both motor and generator characterizes this "Stable-Arc" welder. The working mechanism of all controls is contained in a ventilated inclosed steel cabinet, with hand regulators and switches mounted on a panel that forms a side of the cabinet. Use of a combined voltmeter and ammeter makes possible reading of voltage and amperage on one dial, and eliminates the use of the separate instruments.

A safety push-button switch is incorporated in the control panel for starting and stopping the welder. This switch makes accidental starting impossible.

Lincoln Electric Company, Cleveland, Ohio. July 16, page 104.

Six-Cylinder Engine-Driven Welder

In this portable electric arc welder the engine is a Buda model HS-6 unit built especially for industrial service. The gen-

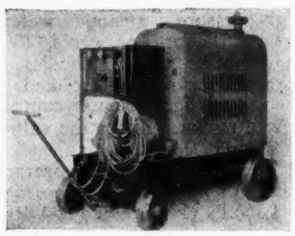


erator is a ball-bearing self-excited single-operator machine rated at 300 amp., with a current range of 90 to 375 amp. Included with the set is a current-reducing resistor by which welding currents down to 25 amp. may be obtained, being adjusted simply by turning the brush-shifting handle. A self-adjusting stabilizing reactor automatically steadies the arc, automatic regulation being obtained by a specially designed magnetic circuit without any moving parts.

General Electric Company, Schenectady, N. Y. Oct. 15 page 611.

Welder With 20- to 600-Amp. Range

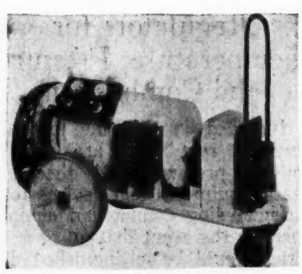
Features involved in this type S gas engine welder are: A range of 20 to 600 amp., and narrow frame and portability.



It is adapted to both heavy current and large-diameter electrodes for rapid depositing of metal, and also to a short arc, with close control of the welding current for welding and repair work.

Any desired current value can be obtained by setting the pointer on the control panel and adjusting the open-circuit voltage by means of the field rheostat. The generator is self-excited. The reactance provided automatically steadies the arc under all welding conditions. The machine is capable of turning out work with metallic electrodes up to ½ in. in diameter and with carbon electrodes up to ¾ in. in diameter.

Wilson Welder & Metals Company, Hoboken, N. J. June 25, page 1055.



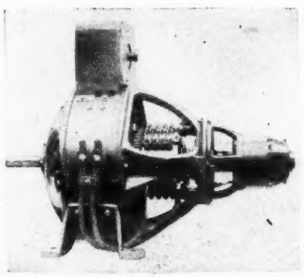
Arc-Welding Generator

The generator illustrated has been developed especially to supply current for the "Carb-O-Flux" arc-welding process, which is a combination of a carbon welding arc and a fluxed wire or rod. The process is applicable to mild steels, aluminum, copper and some alloy steels.

The generator is available for alternating-current, three-phase, 60-cycle, 220- or 440-volt circuits, but it can be furnished for other drives, such as belt

drive from a line shaft, for direct-current operation and alternating-current operation from 25- and 50-cycle circuits, as well as for two-phase circuits.

Fusion Welding Corporation, 103d St. and Torrence Ave., Chicago, Ill. Jan. 21, 1930, page 114.



Generators in Single and Multiple Types

Available in both 300- and 400-amp. capacity, this single-operator arc-welding generator of the belted or direct-coupled type is intended for use where driving power such as motors, gasoline engines or lineshafting is already available.

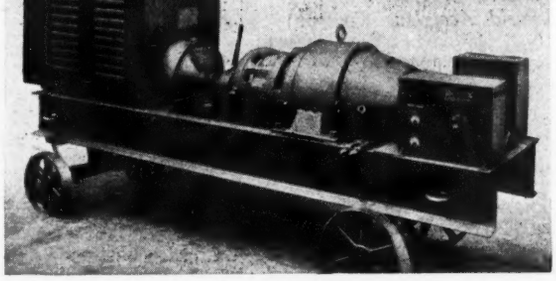
The complete unit includes a generator, direct-connected exciter, control panel, and reactor. The generator has small over-all dimensions to permit mounting where space is limited. Control for the unit is mounted on top of the frame and is inclosed by a sheet-metal cabinet. The welding current range of the 300-amp. unit is 90 to 375 amp., while that of the 400-amp. unit is 120 to 500 amp. The units are of the single-operator type, but multiple-operator generators can be furnished in standard 500-, 750-, 1,000-amp. ratings.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. July 2, page 24.

Dual-Drive Welding Unit

The dual drive arc-welding unit illustrated consists of a standard 300-amp. single-operator welding generator, a 15-hp. induction motor and a six-cylinder, 1,800-r.p.m., model P-45 Continental engine, all mounted in tandem on a structural-steel welded base. The motor operates on 220 volts, but by reconnecting the external motor leads and changing the linestarter coil, it can be used on 440 volts, thereby giving additional flexibility. The welding generator can be driven by either the engine or the motor by simply engaging or disengaging a clutch. The unit can be furnished in all the standard single-operator ratings, stationary or portable.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Nov. 12, page 770.

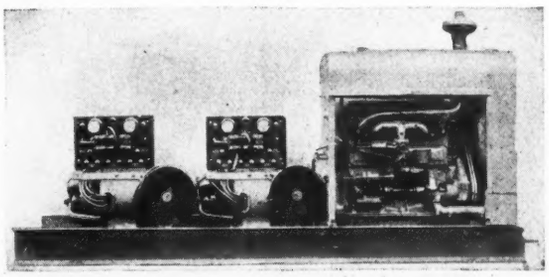


Two-Operator Welding Outfit

Certain advantages over the single-generator, two-operator machine are claimed for this welding unit, which embodies a two-operator machine with two independent generators running at 30 volts each instead of one generator at 60 volts or above. The result is a more flexible and better operating unit as well as materially reduced fuel consumption of the engine used to drive the generators.

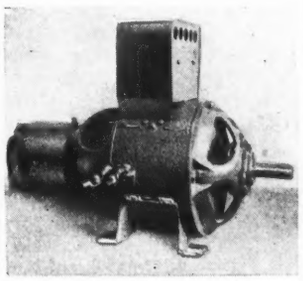
Two 300-amp. generators are placed in line or on a common channel frame and driven through a common shaft by a 40-hp. Continental four-cylinder engine. The generators are equipped with transformers for supplying current to lights, drills and grinders. An air compressor is also mounted on a hinged base so arranged as to be lifted easily in or out of gear. Hoods to completely inclose the generators can also be supplied.

Electric Arc Cutting & Welding Company, 152 Jeliff Ave., Newark, N. J. April 9, page 601.



Welding Generator for Belted Service

This 200-amp. welding generator is differentially compound-wound and designed for a single operator. Its constant-current variable-voltage characteristics, together with the separately excited feature, make for a steady and penetrating arc. Variations in arc length or intensity are automatically compensated for by instantaneous changes in the generator voltage. The control consists of a voltmeter, ammeter, and a single-dial field rheostat for adjusting welding current over the entire range of 60 to 250 amp. The generator requires a driving unit whose maximum rating is: Motor, 10 hp.; lineshaft, 15 hp.; and gas engine, 20 horsepower.



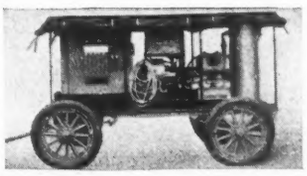
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. June 11, page 978.

High-Strength Bronze Welding Rod

This bronze welding rod, designated Oxweld No. 21, is recommended for all bronze-welding applications, including fusion-welding of brass and bronze, bronze-welding of malleable and gray-iron castings, joining dissimilar metals and building up bearing and other wearing surfaces. Due to its composition it has a uniformly low melting point and an easily controlled flow.

Properties of the rod eliminate almost all boiling and fuming of the weld metal. Annoying fumes are reduced to a minimum, and elimination of oxide and gas inclusions tends to give a sound and strong weld with much better adhesion to iron and steel.

Oxweld Acetylene Company, 30 East 42d St., New York City. March 5, page 404.



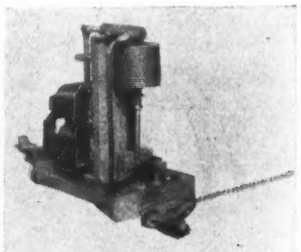
Welder and Air Compressor Unit

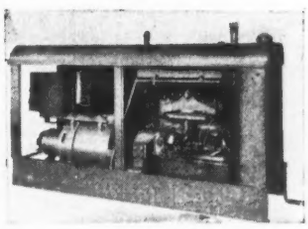
This combined electric welder and air compressor unit is especially adapted to work where riveting, chipping and grinding are required in addition to welding. Motor and welding generator are mounted on the forward part of the truck, with a two-cylinder air compressor and receiver mounted at the rear. Provision is made for disconnecting the compressor when only welding is being done. The unit is fitted with fabric curtains which can be rolled up when the machine is in use and fastened down securely to protect it from the weather.

Wilson Welder & Metals Company, Inc., Hoboken, N. J. Feb. 5, page 245.

Engine-Driven Welder With Idling Device

An idling device which automatically reduces the speed of the gas engine when the welding operation ceases and accelerates the engine again to the proper speed when welding is started is incorporated in this gas-engine-driven welder. It is of 200-amp. rating and is powered by a four-cylinder Wauke-

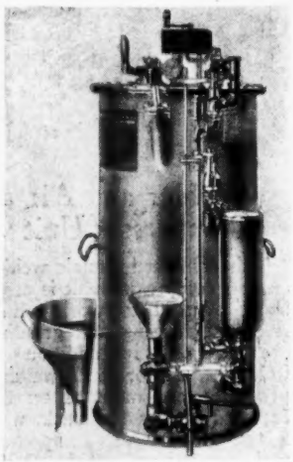




sha engine. The idling device is provided with a control lever which may be set for automatic throttle control for continuous idling or for governed speed.

Other features of the unit are the employment of a welded-steel canopy which totally incloses the outfit, and unified control.

Lincoln Electric Company, Cleveland, Ohio. Sept. 10, page 421.

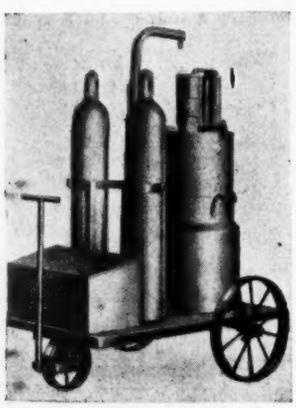


Medium-Pressure Acetylene Generator

Minimum pressure fluctuation during operation is one of the important features of this type MP-101 medium-pressure acetylene generator. Fluctuation during normal operation is said to be less than 1 lb. That permits operation of the generator close to the limit of 15-lb. pressure without loss of gas through the relief valve when the blowpipes are turned off. Time required for refilling with carbide is about 15 minutes.

Carbide capacity is 30 lb. Over-all dimensions are: Height, 60 in.; width, 34 in.; weight, empty, 305 pounds.

Oxweld Acetylene Company, 30 East 42d Street, New York City. March 26, page 519.



Truck for Acetylene Generators

The truck illustrated is designed to carry a Carbic generator and two cylinders of oxygen. A crane is provided to facilitate lifting the gas bell out of the generator when recharging. The crane jib is made in three sections, which can be telescoped when not in use to reduce the height. The truck is fitted with two 24-in. wheels at the rear and a 12-in. castor wheel at the front.

Oxweld Equipment Company, 30 East 42d St., New York City. Aug. 20, page 298.

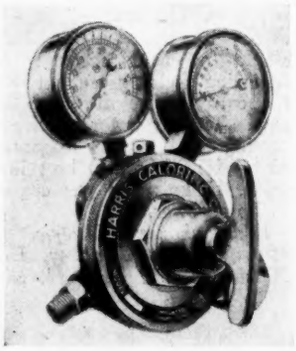
Bronze Welding Rod

High strength with low melting point is claimed for this Oxweld No. 21 welding rod, which may be used for the bronze-welding of steel, bronze, brass, cast iron, malleable iron, wrought iron, copper, nickel, Monel and similar metals. It can also be used for building up wearing surfaces and for fusion-welding of bronze, brass and other copper alloys.

Union Carbide & Carbon Corporation, 30 East 42d St., New York City. Oct. 22, page 653.

Multi-Stage Regulator

Through the use of multi-stage reduction of the gas pressure in the cylinder to the pressure at the welding torch, this "Multi-Stage" regulator gives uniform pressure at the welding tip. Pressure reduction is accomplished in two stages. First-stage reduction is from cylinder pressure down to a constant sub-pressure, from whence the gas is passed to a second stage and then to the torch. Multi-stage reduction permits the use of seats of different characters, each best suited to its function. All parts of the regulator are accessible, and forged material is used throughout.



Harris Calorific Company, Cleveland, Ohio. Nov. 19, page 807.

High-Tensile-Strength Welding Rod

For flat, vertical and overhead manual welding and flat automatic welding this high-tensile-trength welding rod, "Una" No. 65, is especially suitable. It is available in unit packages of 25 lb., in standard sizes varying from $\frac{1}{8}$ to $\frac{1}{4}$ in. in diameter and 14 in. in length, and also in rolls for automatic arc welding.

The rod is particularly suitable for welding boilers, tanks, cast-steel and structural shapes requiring high tensile strength, and may also be used for building up wearing surfaces that require machining.

Una Welding & Bonding Company, Cleveland, Ohio. Oct. 22, page 651.

Manganese-Chrome-Iron Welding Rod

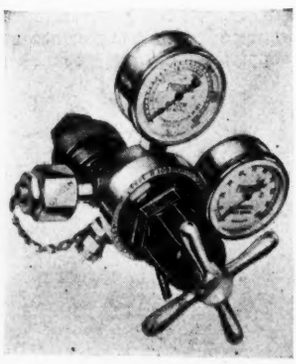
Hascrome is the name given to a manganese-chrome-iron welding rod designed primarily for building up badly worn parts preparatory to surfacing them with Stellite, which is also supplied in the form of welding rod. It may be used for building up large sections of steel or cast iron, and forms a base for Stelliting.

The oxy-acetylene process is considered best for the application of Hascrome, since the hardness of the deposited metal can be controlled by the amount of excess acetylene used in the welding flame, as well as by the rate of cooling. It can also be applied by the metallic arc process.

Haynes Stellite Company, Kokomo, Ind. Dec. 24, page 1014.

Two-Stage Oxygen Regulator

This regulator, designated type R-109, incorporates stem-type valves, and has two-stage pressure reduction, accomplished by two independent sets of diaphragms and valves. In the first stage cylinder pressure is reduced through a non-adjustable reducing valve to about 175 lb. Leaving the first stage the oxygen passes to a second valve and diaphragm assembly, where the pressure is reduced to that desired by the operator, the second-stage reducing valve being adjustable by a hand wheel.

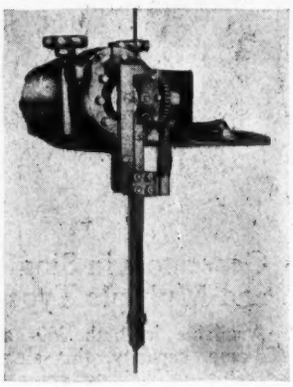


Ability to operate with equal efficiency whether the oxygen cylinder is full or nearly empty, and maintain constant the working pressure, is a feature of the regulator.

Oxweld Acetylene Company, 30 East 42d St., New York City. Nov. 5, page 733.

Improved Automatic Welding Outfit

Designed to operate from either a variable-voltage or a constant-voltage set, this outfit automatically strikes and holds an arc between an electrode and the work to be welded without the operator being required to do other than press the starting button. The nozzle has adjustments for being moved in two planes, and it can easily be reversed to either a right- or left-hand type. Positive feed without slippage, wide range of speeds, ease of adjustment and smoothness of operation are some of the important features of the machine.

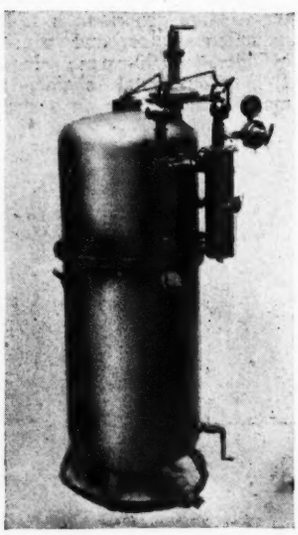


Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Oct. 1, page 534.

Acetylene Generator for Welding and Cutting

This portable acetylene generator for welding and cutting is made in three sizes, 35, 70 and 100 lb. capacity. Simplicity of operation and few moving parts are important features. Carbide feed is controlled by a single valve, which responds to high or low pressure and automatically stops if the pressure is at zero or if the filler plug is open or the generator is not properly closed. The machine is equipped with blowoff valves, pressure control, safety gas purifier and strainer.

Alexander Milburn Company, Baltimore, Md. Sept. 17, page 458.



Small Acetylene Repair Torch

This small acetylene gas tank fitted with a torch close to it and with a handle so that it can be conveniently held with

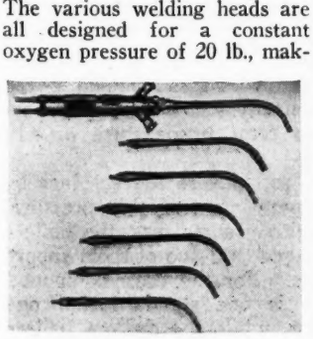
one hand is particularly adaptable to all kinds of soldering, wiping and similar operations on wiring and switchboard connections, as a wide range of flames is obtainable. It consists of a small tank containing 10 cu.ft. of acetylene, a short length of hose, a torch with various attachments and a lighter.

Linde Air Products Company, 30 East 42d St., New York City. Aug. 13, page 264.

Blowpipe for Light Metal

Although primarily designed for aircraft use, this Type W-15 blowpipe is also well adapted to work of all kinds on light tubing or sheet metal. It is of the injector type and can be used on a low-pressure acetylene supply.

Welding heads supplied with the blowpipe, seven in number, are equipped with drawn-copper tips to withstand high temperatures and are curved to facilitate reaching inaccessible places. The various welding heads are all designed for a constant oxygen pressure of 20 lb., mak-



ing it possible for the welder to change the heads without the adjustment of the regulator.

Oxweld Acetylene Company. 30 East 42d St., New York City Feb. 12, page 283.

Welding Electrode for Mild Steel

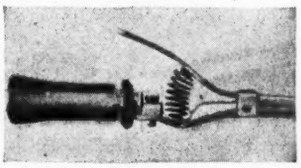
Composition of this electrode, which is designated the "New Kathode," is such that it flows easily, with freedom from sputtering, and it is claimed to produce clean welds, with minimum slag and oxidation, as well as leaving a weld on steel that is soft and readily machinable.

It is furnished in stock lengths of 14 and 24 in. and is packed in metal containers holding 50 lb. each.

Lincoln Electric Company, Cleveland, Ohio. Aug. 13, page 264.

Electrode Holder for Metallic Arc Welding

Known as the improved Type T and designed for greater operating convenience, this holder has a spring-actuated clamp to hold the welding electrode firmly and an easy release feature that permits changing electrodes

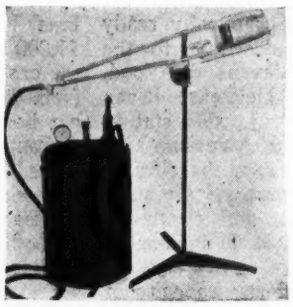


quickly. The welding current is carried from the point of cable entry to the jaws by copper strips instead of through the steel frame of the holder, as in older types. All metallic parts of the holder are coated with cadmium plating.

Lincoln Electric Company, Cleveland, Ohio. April 2, page 557.

Kerosene Torch for Preheating

To facilitate preheating of parts to be welded where the piece cannot be conveniently put

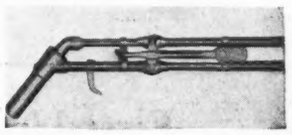


over a forge or other preheating furnace this portable kerosene torch has been developed. It throws a flame about 2 ft. long. Fuel is supplied to the torch from a 10-gal. tank equipped with a double-acting pump. This allows the tank to be refilled while the torch is in operation. An adjustable stand is provided to hold the torch and with 10 ft. of hose for the connection from the tank, the torch is readily adjusted to any position.

St. Paul Welding & Manufacturing Company, St. Paul, Minn. Jan. 7, 1930, page 38.

Automatic Gas-Air Torch

Two valves, one for city gas and the other for compressed air, operated simultaneously by



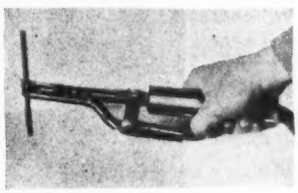
a hand lever, are a feature of the torch illustrated.

The city gas valve is so constructed that once the torch is lighted a small pilot continues to burn when the lever control is released. With this arrangement the torch is put into operation with hand pressure on the lever, which opens up both the city gas and the compressed air.

St. Paul Welding & Manufacturing Company, 174 West 3d St., St. Paul, Minn. May 7, page 757.

Light-Metal Electrode Holder

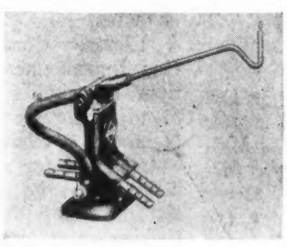
Suitable for all commercial sizes of arc-welding electrodes up to and including ¼ in. in diameter, this holder has jaws of pressed-metal and will grip the



electrode in any position or at any angle.

An adapter which handles ⅜- and ½-in. carbon rods can be obtained for light carbon electrode welding or cutting.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Aug. 20, page 300.



"Gasavers" for Use With Torches

Not only is it possible to conserve welding gas, but with this shut-off valve a saving may also be effected in the time usually required to adjust the torch flame. When the torch is hung on the arm the flame is extinguished. The torch is lighted by lifting it from the arm and passing it over the handy pilot light at the top of the "Gasaver," the same flame as originally adjusted being secured.

Weldit Acetylene Company, Detroit, Mich., Feb. 26, page 364.

Torches for Test Work

A complete laboratory installation of this equipment consists of a small tank of dissolved

acetylene, a hot plate, a Bunsen burner, an acetylene-and-air torch with air control, a reducing valve, a three-way branch valve, and the necessary tubing. The flame can be controlled easily and is hot enough to melt various metals.

A special type of torch uses compressed air in addition to dissolved acetylene. The flame may be changed from the brush type to intense needle-point by adjusting the air supply.

Prest-O-Lite Company, 205 East 42d St., New York, N. Y. Dec. 24, page 1013.

Water-Cooled Electrode Holder

Although designed primarily to insure greater comfort and less fatigue for the operator, the new holder also effects a considerable economy in the use of carbon electrodes.

A feature which contributes to the light weight of the holder is the insertion of the power lead in the hose that carries the water to the holder. Water flowing through the holder acts as a cooling agent for the cables.

Holders are manufactured in sizes for use with ¼-, 5/16-, ⅜- and ½-in. carbons.

Lincoln Electric Company, Cleveland, Ohio. Feb. 26, page. 365.

Events and Men in Power's Field

THE EDITORS WILL WELCOME THE CO-OPERATION OF READERS IN REPORTING INTERESTING HAPPENINGS, PERSONAL OR OTHERWISE

*Spot * News*

TRANSFER *of the world's largest substation, owned and operated by the New York Central Railroad Company, from a building on the corner of Park Ave. and* 50th *St. in New York City to a rock cavern seven blocks away and* 100 *ft. below the street surface in the heart of the Grand Central skyscraper zone, was completed Feb.* 16 *at a total cost of* $3,000,000. *In a little more than eleven months this* 25,000-*kw. station, consisting principally of ten rotary converters and an* 8,000-*amp.-hr. storage battery, was moved without interruption to service.*

* * *

TOTAL ESTIMATED EXPENDITURES *of power companies for new construction and equipment already made, or to be made by March 31, will be* $198,000,000 *and* $180,000,000, *respectively, according to the National Electric Light Association. These amounts are* 10½ *and* 38½ *per cent higher than those for the first quarter of* 1929, *showing that construction has been accelerated in accordance with President Hoover's business program.*

* * *

HYDRO-ELECTRIC DEVELOPMENT *of* 600,000 hp. *on the Cheat River, W. Va., by the West Virginia Power & Transmission Company, as reported in* Power *for Jan.* 7, *is being fought by the Western Maryland Railway on the grounds that the power company is not prepared to go through with the construction program at this time and that granting it control of water power facilities may interfere with the development of the railroad.*

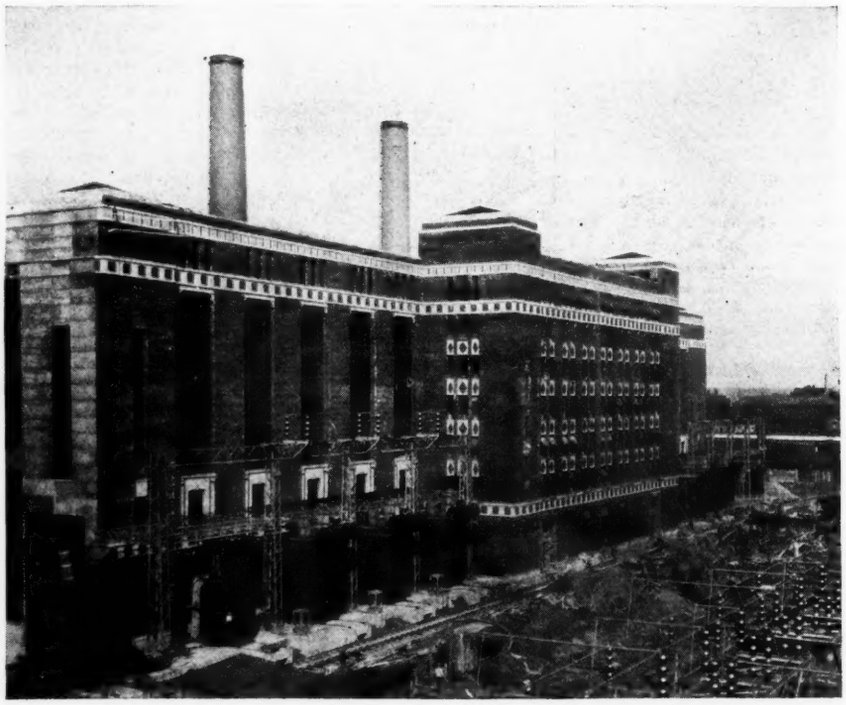
* * *

AS A RESULT *of their acquisition last week of a large block of United States Electric Power Company stock, the Mellon interests have become powerful factors in the direction of a group of power utilities that rivals in importance the Morgan and Insull groups.*

* * *

AT OPENING SESSIONS *of the Senate probe of the Federal Power Commission held last week by Senator Couzens, Charles A. Russell, commission solicitor, and W. V. King, commission accountant, attacked Executive-Secretary Bonner's accounting policies that allowed utilities to include franchises in their valuations. Mr. Bonner replied that government red tape should not strangle the initiative of power companies.*

First Unit of 1,200-Lb. Deepwater Station Now Ready for Operation



DEEPWATER, one of the first large central stations built for 1,200-lb. operation, is practically ready to go on the line, according to the latest reports from Stevens & Wood, Inc. Located on the Delaware River near Penns Grove, N. J., this station is owned jointly by the American Gas & Electric Company and the United Gas Improvement Company. In addition, it supplies steam and electricity to adjoining works of E. I. duPont de Nemours & Company.

Designed for an ultimate capacity of 400,000 kw. the present installation consists of two 53,000-kw. cross-compound turbine units, one for each of the utility companies, and a 12,500-kw. turbine-generator supplying the duPont company. The duPont unit went into service last week, while the other two are receiving final tests at present. It is expected the plant will be in full operation by March 1.

All turbines are designed to operate on steam at a pressure of 1,200 lb. and temperature of 725 deg. F. Each of the 53,000-kw. units consists of an 11,000-kw. high-pressure element and a 42,000-kw. low-pressure element, the latter operating at approximately 400-lb. pressure and exhausting into a 42,500-sq.ft. condenser. The 12,500-kw. turbine is identical in design with the 11,000-kw. high-pressure elements of the cross-compound units. The exhaust from this unit, amounting to 530,000 lb. per hour at full load, is supplied to the duPont company after being superheated to a total temperature of 440 degrees.

Steam is supplied to the turbines by six boilers operating at 1,350-lb. pressure. Equipped with economizers, the boilers are so arranged that two of them supply each turbine. For the cross-compound units there is one standard and one reheat boiler, while the duPont boilers are both standard.

One of the most interesting features of the plant is the installation of two different systems of pulverized-coal firing, the bin system and the unit system. This arrangement was adopted because of a disagreement between the two utility companies—the United Gas Improvement Company favoring the central and the American Gas & Electric Company, the unit system. It was finally decided to install both so that their relative performances under the same conditions might be determined.

Kansas City, Kan., to Build New Steam Plant

Construction this year of a complete new steam power plant adjacent to the present municipal plant is planned by Kansas City, Kan. The new power plant will be designed for 400-lb. steam pressure at 250-deg. superheat. A 10,000-kw. turbine-generator with condensing equipment will be installed, together with a steam generating unit of approximately 150,000-lb. capacity. This will be the first unit in a plant of 100,000-kw. ultimate capacity. Other generating units to be added in the future will have a capacity of 30,000 kw. each, and the boilers will be duplicates of the one installed this year.

Present plans call for the operation of the new plant in conjunction with existing facilities, it being necessary to keep the present plant in operation until the second unit of the proposed plant is installed. Design and construction of the new plant will be handled by the Burns & McDonnell Engineering Company, consulting engineers, of Kansas City, Mo.

Third Unit of Parr Shoals Completed

Total rating of the Parr Shoals (S. C.) steam-electric generating station of the Broad River Power Company has been increased to 75,000 kw. by the completed installation of a third unit. This station is tied in with the other Associated Gas & Electric properties in South Carolina, of which the largest will be the Lexington Water Power Company's hydro plant on the Saluda River. The first waterwheel of this development is scheduled to turn about Sept. 1, after three years of work and an expenditure of many millions. Long-term power contracts with neighboring companies in South and North Carolina will cover 300,000,000 kw.-hr. annually to be derived from the great plant.

Washington Company Buys Generating Facilities

Purchase by the Washington Water Power Company, Spokane, Wash., of the properties of the Kootenai Power Company and the Consumers Company of Coeur d'Alene, Idaho, and certain properties of the Inland Power & Light Company of Lewiston and Grangeville, Idaho, has been announced by M. W. Birkett, vice-president and general manager of the Washington Water Power Company. The announcement was made in connection with the placing on the market by the company of $15,000,000 5 per cent 30-year general mortgage bonds recently.

The Inland Power & Light Company, a subsidiary of the American Power & Light Company, acquired the Lewiston and Grangeville (Idaho) properties six years ago and leased them to the Pacific Power & Light Company, which has since operated them. The properties include hydro-electric generating stations at Lewiston and Grangeville, Idaho, and Asotin, Wash. The Kootenai Power Company and the Consumers Company of Coeur d'Alene, were bought last summer by the American Power & Light Company for approximately $1,100,000.

Goshen Pass Development Postponed

Hydro-electric power development at Goshen Pass, Va., has been postponed by the Virginia Public Service Company, according to Floyd W. King, vice-president and general counsel. Postponement, it was explained, was due to litigation instituted by the Garden Clubs of Virginia, which sought to prevent the development. This suit was settled in favor of the company, the Virginia State Supreme Court holding that the lands of the public service company at Goshen Pass came under the head of private property. In the meantime, however, in order to take care of emergencies that might arise, the company started erection of a steam plant at Goshen Pass, which will begin the generation of power this year.

Mr. King would not undertake to say when the hydro-electric power development would be commenced, further than to intimate that it might be next year. At present the public service company is buying up lands at Goshen Pass, on which it had obtained options. About $250,000 represents the company's expenditures in the vicinity to date. Ultimately a great deal more will be invested.

Dispute Over Construction of Diablo Dam

In the dispute of the City of Seattle, Wash., with Winston Brothers, contracting firm, which is building the new Diablo dam for the city light department, the contractors have been given a check for $230,530 in payment for progress made on the dam during October, November and December, after time for completion of the work had elapsed. The check was delivered after a stipulation agreeing that the payments would not prejudice the city's right to make future claims against them for penalties for delay. Rights of the contractor to claim bonuses or extra rates for compensation for work not contemplated in their contract, and for losses occasioned by the city's own engineering delays on the big job are also protected. The question of claims and counterclaims will be threshed out at conferences soon to be held on the firm's application for an extension of one year on the time for completion of the dam.

Seattle Plant May Change to Pulverized Coal

If a plan proposed by leaders in the coal mining industry in Seattle and the surrounding district is accepted by the city council, the boilers in the Seattle (Wash.) municipal steam plant on Lake Union may be converted and rebuilt for pulverized coal, eliminating the use of oil at the plant. Coal men declared, in a recent meeting with members of the city council, that increased efficiency could be effected and the cost of power production greatly curtailed. The councilmen have asked that concrete plans be drawn and submitted for consideration. F. J. Dohrer of the Wilkeson Coal & Coke Company presented plans by which the oil-fired boilers could be changed to coal burners, with a saving claimed of ⅜c. per kilowatt-hour.

Councilman Tindall said the plan would work to good effect under the ordinance proposing a $10,000,000 bond issue which is to come before the voters at the March election. Of that amount $400,000 would be used for the steam plant. The ordinance, in part, proposes to construct or purchase and install a steam-electric generating station of approximately 10,000-kw. capacity, including the land, building, steam turbine-generator, and necessary equipment for transforming and controlling distribution of electric power. It also authorizes the construction or purchase of extensions to its existing plant by installing 25,000-sq.ft. steam boilers.

Plan Addition to Colorado Steam Plant

A half-million-dollar addition to Valmont, the Public Service Company of Colorado's generating plant near Boulder, Colo., is in immediate prospect, according to announcement by Clare N. Stannard, vice-president and general manager. The enlargement will consist of a 25,000-sq.ft. boiler designed to produce 275,000 lb. of steam at its highest rating and will increase the peak-load capacity of the station said to be the largest pulverized-fuel plant between the Missouri River and the Pacific Coast, to 45,000 kilowatts.

Contract for installation of the boiler and furnace has been awarded to Babcock & Wilcox Company, and work is scheduled to begin April 1. An addition to the present boiler house is part of the building program. The entire job is to be completed Oct. 1, in time to render service during the 1930-31 winter.

Furnace walls will be water-cooled, and air entering the furnace will be heated to 500 deg. F. by gases escaping from the boiler. Steam pressure will be 400 lb. and have a temperature of 700 deg. F. Ash will be taken out in molten form by opening a tap at the bottom of the boiler, allowing ash to flow into a stream of water which will quench the ash and break it up.

Oil Producers Request Protective Tariff

A large group of independent oil producers appeared before the House Committee on Ways and Means recently to urge a tariff of $1 per barrel on crude oil and 50 per cent ad valorem on refined products. Wentworth Franklin of Ardmore, Okla., president of the Independent Petroleum Association of America, appeared as spokesman for a delegation of more than 250 members of the industry. He urged protection for oil comparable with that accorded other great industries of the nation, pointing out that the oil industry carries the greatest burden of taxation of any industry in the United States.

Oil prices, he said, have risen less since 1913 than any other domestic product. Although the oil men have fully co-operated with the federal conservation program, Mr. Franklin asserted that imports have increased in direct ratio with curtailment. Inasmuch as imports could not be restrained without violating the Sherman anti-trust laws, he advocated a tariff as the only solution.

Texas Plant to Add 40,000 Kw.

In keeping with the plans of the Texas Power & Light Company to make the ultimate capacity of its power plant at Trinidad 160,000 kw., an additional unit of 40,000 kw. will be immediately constructed, according to John W. Carpenter of Dallas, general manager. The new unit will increase the capacity of the plant to 80,000 kw. and will consist of a turbine-generator and two high-pressure boilers. An additional reinforced-concrete smokestack, rising 300 ft. above the roof of the building, will be erected. The new unit, like the present one, will burn Texas lignite.

Hydraulic Engineers Wanted by Government

The United States Civil Service Commission announces the following open competitive examinations: hydraulic engineer, $3,800 to $4,000 a year; associate hydraulic engineer, $3,200 to $3,700 a year; assistant hydraulic engineer, $2,600 to $3,100 a year. Applications for these positions must be on file with the Civil Service Commission at Washington, D. C., not later than March 12.

Examinations are to fill vacancies in the Engineer Department at Large, War Department, throughout the United States, and in positions requiring similar qualifications. The entrance salaries are as indicated above. Higher-salaried positions are filled through promotion. Duties of hydraulic engineers will be to undertake, under the general supervision of superiors, studies for the improvement and utilization of rivers for navigation, flood control, power development, or irrigation, or any combination thereof.

Competitors will not be required to report for examination at any place, but will be rated on their education, experience and fitness. Full information may be obtained from the United States Civil Service Commission, Washington, D. C.

Coming Conventions

American Society of Mechanical Engineers. Fiftieth Anniversary Celebration at New York City, Hoboken, N. J., and Washington, D. C., April 5-9, 1930. Semi-Annual meeting at the Hotel Book-Cadillac, Detroit, Mich., June 9-12, 1930. Secretary, Calvin Rice, 33 West 39th St., New York City.

American Institute of Electrical Engineers, District meeting at Springfield, Mass., May 7-10. Annual summer convention at Toronto, Canada, June 23-27. Secretary, F. L. Hutchinson, 33 West 39th St., New York City.

American Society of Heating & Ventilating Engineers. Annual summer meeting at the Curtis Hotel, Minneapolis, Minn., June 23-25. Secretary, A. V. Hutchinson, 33 West 39th St., New York City.

American Society for Testing Materials. Annual meeting at Haddon Hall, Atlantic City, N. J., June 23-27. Secretary, C. L. Warwick, 1315 Spruce St., Philadelphia, Pa.

American Welding Society. Annual meeting at society headquarters in New York City, April 22-25. Secretary, M. M. Kelly, 33 West 39th St., New York City.

Association of Iron and Steel Electrical Engineers. Annual convention and iron and steel exposition at Broadway Auditorium, Buffalo, N. Y., June 16-20. Managing director, John F. Kelly, Empire Building, Pittsburgh, Pa.

Canadian Electrical Association. Annual Convention at the Manoir Richelieu via the S.S. "St. Lawrence," June 11-13, 1930. Secretary, H. M. Lyster, 405 Power Building, Montreal, Quebec.

Engineering Institute of Canada. Annual meeting at the Chateau Laurier, Ottawa, Ont., Feb. 12-14, 1930. Secretary, R. J. Durley, 2050 Mansfield St., Montreal, Que.

International Congress for General Mechanics at Liege, Belgium, Aug. 31 to Sept. 7, 1930. For information address Alb. Schlag, 4 Place Saint-Lambert, Liege, Belgium.

International Railway Fuel Association. Annual meeting at the Hotel Sherman, Chicago, Ill., May 6-9. Secretary, C. T. Winkless, Room 700, LaSalle St., Station, Chicago, Ill:

National Electric Light Association. Annual convention at Municipal Auditorium, San Francisco, Calif., June 16-20, 1930. Secretary, A. J. Marshall, 420 Lexington Ave., New York City.

National Marine Engineers' Beneficial Association. Annual convention at Hotel Barlum, Detroit, Mich., the week of Feb. 10, 1930. Secretary, A. L. Jones, 9th St. and Mount Vernon Place, N. W., Washington, D. C.

National Oil and Gas Power Meeting, under auspices of A.S.M.E. Oil and Gas Power Division and Pennsylvania State College, will be held at State College, Pa., June 12-14. Chairman, L. H. Morrison, c/o *Power*, 10th Ave. and 36th St., New York City.

National Power Show. Held in connection with the International Textile Exposition at Mechanics Building, Boston, Mass., April 28 to May 3. For information, write to the New England Association of Commercial Engineers, 53 Devonshire St., Boston, Mass.

Second Plenary World Power Conference. Convenes at Berlin, German, June 16-25. Chairman of the American Committee, O. C. Merrill, Edmunds Building, Washington, D. C.

PERSONALS

T. A. BURDICK, formerly chief engineer of the Texas-Louisiana Power Company, is now chief engineer of the General Water Works and Electric Corporation at Fort Worth, Texas.

PERCY H. WILSON has resigned as executive engineer of the University of Pennsylvania to associate himself with Edward J. Cheney, consulting engineer, of New York City.

GARDNER S. WILLIAMS of Ann Arbor, Mich., has been named acting president of the American Engineering Council to serve until the return of President Carl E. Grunsky from a trip around the world. A representative of the Detroit Engineering Society, Mr. Williams has been identified with the A.E.C. since its organization ten years ago.

J. E. THOMAS has been appointed superintendent of power of the West Penn Power Company. He has supervision of all power stations, substations and operation. R. E. MARTIN has been named superintendent of power stations to assist Mr. Thomas in that division.

CHARLES MACL. MOSS, formerly assistant manager of the circuit-breaker engineering department at the East Pittsburgh works of the Westinghouse Electric & Manufacturing Company, has been made manager of the engineering department at the company's South Bend works.

WILLIAM I. TURNER, for the past three years in the power transformer section of the Westinghouse Electric & Manufacturing Company, at Sharon, Pa., is now sales engineer with the Railway & Power Engineering Corporation of Toronto, Canada.

FREDERICK A. SCHAFF, since 1915 vice-president of the Superheater Company, has been elected president of the company to succeed GEORGE L. BOURNE, who was made chairman of the board.

HENRY A. SUPRENANT has been appointed assistant superintendent of power of the western division of the New England Power Association, replacing H. B. SOPER, who has been made superintendent of power of the northern division of the association.

S. B. TAYLOR, engineer in charge of drafting for the Reliance Electric & Engineering Company, has been promoted to the position of works manager of the company's Cleveland factory.

FRANK M. KERR, vice-president and general manager of the Montana Power Company, was the guest of honor at a dinner on Jan. 28 tendered him by his associates in celebration of his completion of 40 years' service with the company.

Business Notes

Pennsylvania Pump & Compressor Company, Easton, Pa., announces the appointment of Kring-Becker Engineering Company, Mercantile Library Building, Cincinnati, Ohio, as its representative in the Cincinnati and St. Louis districts.

Girtanner Engineering Corporation has moved its main office from New York City to Palmyra, N. J., where the company's factory is located. The New York sales office is now at 30 Church St.

Yale & Towne Manufacturing Company, Stamford, Conn., have appointed James C. Morgan to take complete charge of all materials-handling-equipment sales, replacing E. C. Waldvogel, vice-president in charge of sales, who retires April 1. The Philadelphia branch of the company, at 4530 Tacony St., announces the addition of a four-story concrete building equipped for the manufacture and assembly of Stuebing hand-lift trucks and skid platforms.

Electric Machinery Manufacturing Company, Minneapolis, Minn., announces that its Pittsburgh office has moved to 2300 Koppers Building.

Haynes Stellite Company, unit of the Union Carbide & Carbon Corporation, New York City, announces the appointment of the following: E. E. LeVan, general sales manager; J. H. Maguire, works manager; F. T. McCurdy, plant superintendent; L. H. Brown, research engineer.

The Duraметallic Corporation, Kalamazoo, Mich., recently moved into its new factory building at 2104 Factory St., which provides more than twice the manufacturing space of the old plant. A research and testing laboratory has also been installed.

The Brady Conveyors Corporation, Chicago, Ill., has taken over the sales and manufacturing rights of the Universal Coal Spreader Company.

Foote Bros. Gear & Machine Company, Chicago, Ill., has appointed Max E. Landry, 202 Local Building, Oklahoma City, Okla., as its representative in the northern half of Oklahoma. The Annex Equipment Company, 406 San Francisco St., El Paso, Texas, now represents the company in western Texas, New Mexico and all the states of Mexico except Nuevo Leon and Tamaulipas.

Reading Chain & Block Corporation, Reading, Pa., has appointed W. J. Zink, of Homewood Station, Ala., as its representative in Alabama and vicinity.

With the Society Sections

A.S.M.E., Anthracite-Lehigh Valley Section. Meeting at the Necho-Allen Hotel, Pottsville, Pa., at 6 p.m., Feb. 28. Subjects: "The New Hellgate Plant at New York City," by J. B. Gaffney, Allentown, Pa., and "Electric Hoists for the Mining Industry," by A. J. Nicht, Milwaukee, Wis.

A.S.M.E., Philadelphia Section. Meeting in the auditorium of the Engineers Club on Feb. 25 at 8 p.m. Subject: "The Relation of River and Harbor Problems to the Hydraulic Laboratory," by H. M. Eaton, Bureau of Standards.

A.I. & S.E.E., Philadelphia Section. Meeting at the Engineers Club on March 1. Subject: "Magnetic Clutches in Industry," by H. E. Hodgson, Cutler-Hammer Corporation.

A.S.S.T., Philadelphia Chapter. Meeting at the Engineers Club on Feb. 28. Subject: "Corrosion-Resistant Steels," by Henry A. De Fries, Ludlum Steel Company.

Cleveland Engineering Society. Fiftieth anniversary celebration meeting at the Hotel Hollenden, Cleveland, Ohio, on March 14-15.

Midwest Bituminous Coal Conference. Held under the direction of the Engineering Schools of Purdue University, Coal Trade Association of Indiana and Illinois Coal Bureau, at Lafayette, Ind., April 9-11. Chairman, W. A. Knapp, Purdue University, Lafayette, Ind.

New England States Association of the National Association of Power Engineers. Annual convention and exhibition of power machinery at the State Armory, Salem, Mass., June 19-20, 1930. Secretary, E. S. Daniels, 113½ Bridge St., Salem, Mass.

Trade Catalogs

Boiler Nozzles—Complete engineering data on outlet connections for boilers, pressure vessels, tanks and shells are contained in Bulletin 29-13 of the Taylor Forge & Pipe Works, Box 485, Chicago, Ill. The booklet includes all dimensions on boiler nozzles required by designing engineers.

Burners—Installation specifications and blueprints on gas burners are contained in the latest catalog of the Lee B. Mettler Company, 406 South Main St., Los Angeles, Calif. Its 24 pages are devoted to diagrams and illustrations of structural details and installations.

Motors — A comprehensive treatise on synchronous motors is contained in an 85-page booklet, No. GEA-1191, published by the General Electric Company, Schenectady, N. Y. Construction details, operation and application are well covered with many illustrations of actual installations. Another publication of the company, No. GEA-714B, describes and illustrates type MD-400 direct-current mill motors, and folder No. GEA-1193 is devoted to automatic switching equipment for preferred emergency operation of power lines.

Capacitors—"Capacitors for Power-Factor Correction" is the title of circular No. 1670-B, a recent publication of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. This illustrated circular briefly discusses the causes of low power factor and means of correcting it.

Fuel Prices

COAL

The following table shows the trend of the spot steam market in various coals, f.o.b. mines; mine run, except Pittsburgh gas slack:

Bituminous (Net Tons)	Market Quoting	Price per Ton
Navy Standard	New York	$2.30 @$2.50
Kanawha	Columbus	1.40 @ 1.60
Smokeless	Cincinnati	2.00 @ 2.25
Smokeless	Chicago	2.00 @ 2.25
S. E. Kentucky	Chicago	1.40 @ 1.60
Steam	Pittsburgh	1.40 @ 1.65
Gas Slack	Pittsburgh	.90 @ 1.00
Big Seam	Birmingham	1.35 @ 1.50
Anthracite		
(Gross Tons)		
Buckwheat	New York	$2.70@$3.00
Barley	New York	1.40@ 1.50

FUEL OIL

New York—Feb. 20, f.o.b. Bayonne, N. J., 28@34 deg., Baumé, industrial use, tank-car lots, 4.75@5.5c. per gal.; f.o.b. Bayway, 36@40 deg., furnace, tank-car lots, 6c. per gal.

St. Louis—Feb. 13, tank-car lots, f.o.b. St. Louis, 24@26 deg., $1.695 per bbl., or 42 gal.; 26@28 deg., $1.745 per bbl.; 28@30 deg., $1.795 per bbl.; 30@32 deg., $1.845 per bbl.; 32@36 deg., gas oil, 4.276c. per gal.; 37@40 deg., distillate, 5.105c. per gal.

Pittsburgh—Feb. 18, f.o.b. local refinery, 30@34 deg., fuel oil, 4.5@4.75c. per gal.; 36@40 deg., 4.62½@4.75c.

Philadelphia—Feb. 18, 13@19 deg., $1.05@$1.10 per bbl. or 42 gal.; 22 deg. plus, $1.575@$1.625 per bbl.; 23@27 deg., $2.10@$2.15 per bbl.

Cincinnati—Feb. 11, tank-car lots, f.o.b. local refinery, 24@26 deg. Baumé, 5.25c. per gal.; 26@30 deg., 5.5c. per gal.; 30@32 deg., 5.75c. per gal.

Chicago—Feb. 10, tank-car lots, f.o.b. Oklahoma, freight to Chicago, 90c. per bbl. or 42 gal.; 22@26 deg., 85@90c. per bbl.; 26@30 deg., $1.05@$1.10 per bbl.; 30@32 deg., $1.30@$1.35 per bbl.

Boston—Feb. 17, tank-car lots, f.o.b., 12@14 deg., Baumé, 3c. per gal.; 28@32 deg., 5c. per gal.

Dallas—Feb. 15, f.o.b. local refinery 26@30 deg., $1.35 per bbl. or 42 gallons.

New Plant Construction

COMPILED BY THE MCGRAW-HILL BUSINESS NEWS DEPARTMENT, WHICH IS PREPARED TO FURNISH A MORE COMPLETE DAILY SERVICE TO THOSE WHO WISH IT

Ark., Forest City—Arkansas Power & Light Co., Pine Bluff, awarded contract for the construction of an ice plant here to Phoenix Utility Co., Pine Bluff. Estimated cost $75,000.

Colo., Pueblo—Southern Colorado Power Co., c/o W. N. Clark, Gen. Mgr., Colorado Bldg., plans extensions and improvements to power plant at Canon City and Cripple Creek, also extends dam at Skagway lake near Cripple Creek. Estimated cost $50,000.

Conn., Hamden—City plans the construction of a pumping station in connection with sewage system in Spring Glen. Estimated cost $50,000. F. W. Wright, Town Hall, is engineer.

Conn., Mansfield—State Bd. of Finance, State House, Hartford, is receiving bids for the construction of a power plant here. Estimated cost $40,000. Towner & Sellew, 365 Main St., Middletown, are engineers.

Conn., Newington—Hartford Hospital, L. A. Sexton, Supt., 241 Oxford St., Hartford, is having preliminary plans prepared for the construction of a hospital including refrigeration plant, elevator, etc., at Mary Ogden Avery Convalescent Hospital. Kendall, Taylor Co., 209 Columbus Ave., Boston, Mass., is architect.

Conn., New Haven—New Haven Gas Light Co., H. L. Sterrett, 80 Crown St., plans remodeling gas apparatus, gas plant to house entire operating department, garage and storage buildings, waste boiler steam accumulator, new service connections and meters, etc. Estimated cost $600,000.

Conn., Norwalk—Haine Bros., Meadow St., is receiving bids for the construction of a 55 x 150 ft. ice manufacturing plant. Estimated cost $40,000. H. E. Koerner, 83 Fairfield Ave., Bridgeport, is architect.

Ga., Atlanta—Atlanta Ice & Coal Co., 106 Collins St., S. E., plans extension to cold storage plant on Piedmont Ave., N. E. Estimated cost $50,000.

Ga., Savannah—City awarded contract for rebuilding Gwinnett St. pumping station to J. B. McCrary & Co., Citizens & Savings Bank Bldg., Atlanta. Estimated cost $37,000.

Ill., Chicago—Commonwealth Edison Co., 72 West Adams St., is having plans prepared for the construction of a 2 story electric service station at California Ave. and Addison St. Estimated cost $1,000,000. Holabird & Root, 333 North Michigan Ave., are architects.

Ill., Chicago—Houlihan, Hauser & Marks, 64 West Randolph St., Archts., will receive bids about Mar. 5 for the construction of a 9 story hospital including steam heating, and ventilation systems, elevators, etc. at 730 South Lincoln St. for General Foot Hospital Assn., c/o architects. Estimated cost $800,000.

Ind., Indianapolis—Indiana Insane Hospital, awarded contract for the construction of a hospital including power plant, boilers, stokers, etc. at 3000 West Washington St. to Service Construction Co., 301 Castle Hall. Estimated cost $225,000.

Md., Baltimore—Gulf Refining Co., 2117 Aliceanna St., plans the construction of a boiler house, warehouse, and machine shop, at Frankhurst Ave. and Childs St. Estimated cost $150,000. Private plans. Work will be done by day labor.

Mass., Lynn—City, D. Dineen, City Hall, is having sketches made for the construction of a police station, garage and boiler house. Estimated cost $150,000. Private plans.

Mass., Mattapan (Boston P. O.)—Hospital Dept., J. J. Dowling, 819 Harrison Ave., Boston, awarded contract for additions and alterations to hospital including power plant and laundry, on River St. here to A. Piotti Co., 708 Dudley St., Dorchester. Estimated cost $252,421.

Mo., Concordia—City plans an election early in April to vote $30,000 for the construction of a municipal light plant and $52,000 for sewer system. W. B. Rollins & Co., 339 Railway Exchange Bldg., Kansas City, Mo., are engineers.

Mo., Moberly—City is having tentative plans made for the construction of a municipal electric light plant. Estimated cost $150,000. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., are engineers.

Mo., St. Louis—Bd. of Education, 911 Locust St., will receive bids end of March for the construction of first unit of vocational school including power plant, laboratories, etc. at School St. and Channing Ave. Estimated cost $1,750,000. G. W. Sanger, Acting Bldg. Commissioner.

N. J., Deal—Casa Blanca Del Mar Beach Club, 433 Cookman Ave., Asbury Park, is having revised plans prepared for the construction of a 12 story apartment building including steam heating, ventilation and refrigeration systems, boilers, elevators, etc., here. Estimated cost $1,000,000. W. F. B. Koelle, 433 Cookman Ave., Asbury Park, is architect.

N. J., Red Bank—Merchants Trust Co., K. McQueen, 30 Broad St., will receive bids late in March for the construction of a 6 story bank office, and stores building including steam heating and ventilation systems, boilers, elevators, etc., at Mommouth and Broad St. Estimated cost $1,000,000. Warren & Wetmore, 16 East 47th St., New York, are architects.

N. Y., New York—Harlem Hospital, will receive bids late in March for addition to power plant. Estimated cost to exceed $40,000. Sloan & Robertson, 420 Lexington Ave., are architects. Lang & Noska, 420 Lexington Ave., are structural architects.

O., Akron—Graham, Anderson, Probst & White, Railway Exchange Bldg., Chicago, Ill., Archts., will receive bids until Feb. 26 for the construction of a 17 story hotel at Main and State Sts. here for DeWitt Hotel Co., Hollenden Hotel, Cleveland. Estimated cost $3,000,000.

Okla., Wetumka—City is having surveys made for waterworks system including impounding reservoir, dam, pumping station, etc. Estimated cost $60,000. V. V. Long & Co., Colord Bldg., Oklahoma City, are engineers.

Pennsylvania—Pennsylvania Power Co., 635 Lawrence Ave., Ellwood, had plans prepared for the construction of two outdoor sub-stations one at New Castle, and one at Sharon; also 2 story service building at New Castle. Estimated cost $200,000, $150,000 and $100,000 respectively. Maturity 1931.

Pa., Philadelphia—Rubel Ice Corp., c/o W. Steele & Sons Co., 124 North 15th St., Contrs., will build a 1 story, 66 x 195 ft. ice plant at Parrish and June Sts. Estimated cost $100,000.

Pa., Pittsburgh—Gulf Refining Co., Frick Annex, awarded contract for foundation and excavation for a 34 story office building at 7th and Grant Sts., to Booth & Flinn Ltd., 1942 Forbes St. Estimated cost $10,000,000.

Texas—Emery, Peck & Rockwood Development Co., Sequin, and 208 South La Salle St., Chicago, Ill., considering proposals for machinery and equipment, building materials, power plant machinery and equipment, etc. for the construction of five dams and power plants on the Colorado River between Sequin and Marble Falls including super-power plant. Estimated cost approximately $15,000,000. Will start actual work within three months.

Ont., Simcoe—Norfolk Fruit Growers Association, J. E. Johnson, Mgr., will receive bids until Mar. 15 for the construction of a cold storage plant on Norfolk St. Estimated cost $100,000. E. H. Darling, 36 James St., S., Hamilton, is engineer.

Quebec—Beauharnois Power Co., awarded contract for four 50,000 and two 8,000 hp. turbines and embedded parts for future six 50,000 hp. units, in connection with power development to Dominion Engineering Works, Lachine.

Equipment Wanted

Boilers—Columbia, Mo.—City J. S. Bicknell, Clk., plans to purchase two high pressure boilers for light plant. Estimated cost $75,000.

Engine—Fall City, Neb.—City plans to purchase a new 1,000 hp. Diesel engine in connection with proposed extensions to power plant. Estimated cost $50,000.

Heaters, Pump Water Softeners, Etc.—Indianapolis, Ind.—Bd. of Trustees, Central State Hospital, will receive bids until Feb. 28 for the installation of heaters, pump, water softeners and other boiler room equipment, etc. for Central State Hospital.

Pumping Equipment—Stoney Creek, Ont.—Pumping equipment, etc. for proposed waterworks system. Estimated cost $75,000.

Pumping Equipment—Crescent, Okla.—City plans to purchase pumping equipment, etc. for proposed waterworks improvements. Estimated cost $15,000.

Pumps—Tishomingo, Okla.—City plans to purchase pumps, etc. for proposed waterworks system. Estimated cost $25,000.

Pumps, Etc.—Seneca, Kan.—City will receive bids until Mar. 13 for a 500 g.p.m. motor driven, 500 g.p.m. gasoline engine driven and 40 g.p.m. vertical shaft centrifugal pumps, etc. for proposed waterworks system. Estimated cost $30,000.

Switching Equipment—Washington, D. C.—U. S. Government, D. Lynn, Capitol, Archt., is receiving bids for replacement of high-tension switching equipment at Capitol power plant including reconstruction of main entrance hallway, including stairway; installation of truck-type circuit breakers, etc.; connections to generators, feeders, resistances, panel boards and other equipment and accessories.

Industrial Projects

Ala., Gadsden—Gulf States Steel Co., W. H. Coverdale, Pres., Brown-Marx Bldg., Birmingham, plans to expend between $17,000,000 and $20,000,000 for new mills and additions to plant here including blooming mill $1,000,000; plate mill, $2,000,000; sheet mill, $2,000,000; four open-hearth steel furnaces; 27 by-product coke ovens; 5000 ton blast furnace and power plant duplicating $3,500,000 plant built last year. Work under way on blooming mill and sheet mill.

Calif., Long Beach—Procter & Gamble, 300 Avery St., Los Angeles, awarded contract for the construction of a 100 x 700 and 100 x 500 ft factory including 500 ft. wharf and 14 steel storage tanks here to Stone & Webster, Laughlin Bldg., Los Angeles. Estimated cost $5,000,000.

Calif., Los Angeles—Dry Ice Corp., c/o Austin Co., of California, 777 East Washington St., Engrs. and Contrs., will build a 1 story, 110 x 145 ft. factory on Pitts St. Estimated cost $60,000.

Calif., Los Angeles—Goodrich Rubber Co., 5400 East 9th St., is having plans prepared for a 1 story, 51 x 250 ft. addition to plant. Estimated cost $150,000. Private plans.

Calif., Los Angeles—Liquid Carbonic Corp., 5100 South Kedzie Ave., Chicago, Ill., awarded contract for the construction of a 1 story, 145 x 240 ft. factory on Pitts St., here, to H. M. Baruch Corp., Lincoln Bldg., Los Angeles. Estimated cost $60,000.

Calif., Los Angeles—Pioneer Paper Co., 5500 South Alameda St., is having plans prepared for the construction of a 2 and 3 story, 50 x 160 ft. emulsion plant. Estimated cost $40,000. Hamm, Grant & Brunner, Ferguson Bldg., are engineers.

Calif., South San Francisco—Consolidated Chemical Industries, Financial Center Bldg., San Francisco, awarded contract for addition to plant here, to The Austin Co. of California, Russ Bldg., San Francisco. Estimated cost $250,000.

Mass., Attleboro—L. G. Balfour Co., County St., manufacturing jewelers, awarded contract for section No. 1 of factory to H. F. Lull, Est., Main St., Pawtucket, R. I., also plans addition to section No. 2, 1 and 3 story, 40 x 60 and 40 x 350 ft. Estimated cost $40,000 and $150,000 respectively. O. M. Higgins, Park St., is architect.

N. J., Bloomfield—The Bakelite Corp., 230 Grove St., will soon award contract for the construction of a 3 story, 135 x 55 x 155 ft. plant. Estimated cost $100,000. R. Bolton, 45 Branford Pl., Newark, archt.

N. J., Newark—National Lock Washer Co., 40 Hermon St., will receive bids until Feb. 25 for the construction of a 4 story, 30 x 50 ft. addition to factory at Pennington and Hammond Sts. Estimated cost $50,000. Monks & Johnson, 99 Chauncy St., Boston, Mass., are archts.

N. J., Trenton—Trenton Potteries Co., North Clinton and Ott Sts., is receiving bids for the construction of a 5 story, 65 x 168 ft. pottery plant. Estimated cost $150,000. Lockwood Greene Engrs., Inc., 100 East 42nd St., New York, N. Y., are engineers.

Pa., Carnegie—Superior Paper Products Co., C. J. Bausman, Pres., will soon award contract for the construction of a 1 story, 180 x 360 ft. paper plant. Estimated cost $150,000. Braziell & Anderson, 309 4th Ave., Pittsburgh, are architects.

Pa., Erie—General Electric Co., J. Wright, East Lake Rd., is receiving bids for the construction of a 1 story, 75 x 225 ft. factory. C. E. Schnur, c/o owner, is architect.

Tenn., Chattanooga—Coca Cola Bottling Co., 214 Fort St., taking bids for the construction of a 2 story, 82 x 120 ft. bottling plant including separate heating and power plant. Estimated cost $150,000. W. Crutchfield & Associate, First National Bank Bldg., are architects.

Tex., Sweetwater — International Harvester Co., 606 South Michigan Ave., Chicago, Ill., c/o B. N. Roberts, Sweetwater Br. Mgr., will soon award contract for the construction of a 2 story, 100 x 183 ft. factory and 100 x 300 ft. storage building here. Estimated cost $250,000. Private plans.

Ontario—Page Hersey Tubes, Ltd., 103 Church St., Toronto, plans the construction of a seamless tube mill. Estimated cost $2,000,000. Private plans. Location not yet decided.

Ont., Callender—Pierce Lumber Co., Ferguson Black, North Bay, Ont., plans the construction of a saw mill, lath mill, pickett mill including machine shop, etc., here. Estimated cost $100,000. Private plans. Electric and steam power.